AN ANALYSIS OF DESIGN CHALLENGES REGARDING THE SUSTAINABLE USE OF PROPS IN SCENIC DESIGN

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ETHICAL DECLARATION

I hereby declare that I am the sole author of this thesis and that I have conducted my work in accordance with academic rules and ethical behaviour at every stage from the planning of the thesis to its defence. I confirm that I have cited all ideas, information, and findings that are not specific to my study, as required by the code of ethical behaviour, and that all statements not cited are my own.

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22/6/2023
Signature:

ABSTRACT

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Master's Program in Design Studies

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This study focuses on the challenges regarding the use of props in sustainable scenic design processes, how to apply sustainable approaches to scenic design, and how to increase recycling and reuse of props. The current environmental crisis in terms of waste materials in stage design, and lack of research on this topic led to this study. The aim is to determine the challenges of the design process, with the help of feedback from actively working professionals, transfer possible existing solutions to the scenic design processes, and suggest new solutions. After the research on existing literature and previous studies, the methods of this study are selected as interviews with professionals from different disciplines such as digital artists, scenic designers, municipal and private theatres, and a survey for selected scenic designers with specific questions in order to answer the research questions of this study. The use, transportation, and storage of props bring several environmental challenges that are often not accounted for. Scenic designers state that low budget, the cost of transportation, and the lack of storage for props are some of the challenges in scenic

design. The outcomes direct the study to reveal the lack of scenic design studies, especially in Turkey and, to reveal possible scenic design developments. This study suggests alternative design guidelines and solutions for scenic design with the help of sustainable approaches. The solutions to be gained from this study have the potential to benefit scenic designers, producers, and performing artists worldwide.

Keywords: set design, scenic design, sustainability, sustainable design, props storage, digital technologies in stage design

ÖZET

SAHNE TASARIMINDA SAHNE MALZEMELERİNİN KULLANIMI ÜZERİNE SÜRDÜRÜLEBİLİRLİĞİN UYGULANMASINDA KARŞILAŞILABİLECEK ZORLUKLAR ÜZERİNE İNCELEME

Karakuş, Elif

Tasarım Çalışmaları Yüksek Lisans Programı

Tez Danışmanı: Prof. Dr. Deniz Hasırcı

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Bu çalışma, sahne tasarım süreçlerinde kullanılan sahne malzemelerinin kullanımı, taşınması ve depolanması ile ilgili zorluklara odaklanmakta; sahne tasarımına sürdürülebilir yaklaşımların nasıl uygulanabileceğini, sahne malzemelerinin geri dönüşüm ve yeniden kullanımının nasıl artırılabileceğini incelemektedir. Çalışmanın amacı, tasarım sürecinin zorluklarını belirlemek ve aktif olarak çalışan profesyonellerden gelen geri bildirimlerle mevcut çözümleri sahne tasarım süreçlerine aktarmak ve yeni çözümler önermektir. Çevresel kriz bağlamında, sahne tasarımında ortaya çıkan atık malzemeler ve bu konuda yapılan araştırmaların yetersizliği bu çalışmaya yol göstermiştir. Bu çalışmanın yöntemleri, dijital sanatçılar, sahne tasarımcıları, belediye tiyatroları ve özel tiyatrolar gibi farklı disiplinlerden profesyonellerle yapılan röportajlar ve araştırma sorularına cevap arayan sorular içeren bir anketin seçilen sahne tasarımcılarına uygulanması ile yapılan bir araştırma şeklinde belirlenmiştir. Sahne malzemelerinin kullanımı, taşınması ve depolanması çoğu zaman

hesaba katılmayan birçok çevresel zorlukları beraberinde getirmektedir. Sahne tasarımcıları, gösteri tamamlandıktan sonra bazı sahne malzemelerinin atıldığını ve bu durumun büyük bir israf oluşturduğunu; bazılarının ise yeniden kullanım ve geri dönüşüm için depolandığını belirtmektedir. Düşük bütçe, taşıma maliyetleri ve sahne malzemeleri için depolama eksikliği sahne tasarımında karşılaşılan diğer zorluklardır. Sonuçlar, sahne tasarımı alanında yapılan çalışmaların, özellikle Türkiye' de eksikliğini ortaya çıkarmakta ve olası sahne tasarımı gelişmelerini açığa çıkarmaktadır. Bu çalışma, sürdürülebilir yaklaşımların yardımıyla sahne tasarımı için alternatif tasarım prensipleri ve çözümler önermektedir. Bu çalışmadan elde edilecek çıktılar, dünya çapında sahne tasarımcılarına, yapımcılara ve sanatçılara fayda sağlama potansiyeline sahiptir.

Anahtar Kelimeler: set tasarımı, sahne tasarımı, sürdürülebilirlik, sürdürülebilir tasarım, dekor depolama, sahne tasarımında dijital teknolojiler

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I also would like to thank my friends for always encouring me and helping me, my art therapist for helping me to manage this process mentally, and finally I would like to give my biggest thanks to my family members for always being by my side, supporting me in this challenging process.

PREFACE

The process of this thesis began with the motivation to combine interior architecture and performing arts. The common ground for these two fields was scenic design. Lack of research on this topic and lack of awareness in this area, especially in Turkey, led the study to discover and focus on the challenges in scenic design process and to give suggestions in light of previous studies and the opinions of professionals in this field.

The first focus of the study was meant to be a psychological study on the colors and light use in scenic design. However, after literature and field research, the focus of the study changed direction to discover the main reasons for the lack of study and lack of awareness in this field. In order to discover the reasons, the first aim was to determine the challenges and problems. The very first challenge was the budget limitation and related to that design limits in scenic design. In this part, sustainability was determined as a possible solution to these detected challenges.

The first year of the study thesis was affected by post-pandemic period and one of the challenges was to contact the professionals in this field. However, the pandemic era caused the significant entry of digital technology into scenic design. Therefore, the next step was to contact the digital artists in Turkey to find out the role of digital technology in scenic design and how it may help sustainable design. In addition, it was discovered that one of the most effective ways to implement sustainability in scenic design was to work on the props to avoid waste of energy and material use.

The final step was to create a survey for scenic designers in order to ask their opinions on sustainability, how aware they are of it and what they do for sustainable design in their works. After a very challenging process including the lack of previous studies and then the challenge to contact the professionals for interviews and surveys, the thesis study was completed succesfully after two years.

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Elif KARAKUŞ

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LIST OF ABBREVIATIONS

AA: Anadolu Ajansı

AACT: American Association of Community Theatre

APAC: Australian Performing Arts Convervatory

AR: Augmented Reality

BFA: Bachelor of Fine Arts

BFI: British Film Institute

CGI: Computer-Generated Imagery

LED: Light-Emitting Diode

MFA: Master of Fine Arts

MM: Milimeter

NYU: New York City

OED: Oxford English Dictionary

PROPS: Properties

SXSW: South by Southwest

TISCH: Tisch School of the Arts at New York University

ZKM: Zentrum für Kunst und Medien

2D: 2-dimensional

3D: 3-dimensional

CHAPTER 1: INTRODUCTION

The purpose of this study is to analyze the scenic design process regarding the use, transportation, and storage of props and to discuss how to apply sustainability to scenic design. In this context, there are several challenges and solutions to these challenges. The design process, the main actors in this process, design elements; selection, making, transportation, storage and recycling of props are discussed through this thesis with the help of existing literature and guidance by professionals in different fields related to scenic design.

The introduction discusses on the lack of research on sustainable scenic design in the existing literature and lack of studies in this field, especially in Turkey. This chapter explains what this study aims at, what the methods are that are used for this study and what the findings are in previous studies on this topic. In the second chapter of the article, which includes the definitions and framework of scenic design terms, it examines and gives detailed information about the scenic design, production team, elements of scenic design, production sequence, challenges in scenic design process, props, live performing arts, sustainable design, and digital art.

The following chapter gives brief information about the scenic design history and discusses previous examples from the world and Turkey. The fourth chapter, which examines the method of the study, discusses the methods, instruments, and application process, which includes interviews with professionals such as municipal theatres, private theatres, scenic designers, and digital artists and the survey applied to selected scenic designers. The chapter ends with the findings and solutions. In the conclusion part, the output of the previous parts is summarized. The comparison between the solutions benefits the scenic designers, producers, and performing artists.

According to Brako and Gilbert (2022), designing and building of scenery backgrounds for theatre, film, and television is called scenic design. Theatre, film, and television scenic design have similar approaches, similar techniques and aesthetic requirements. However, the main difference is the spaces that are created for performances in theatre, cinema, for television. The proscenium, thrust, arena, and

other created areas are examples of theatrical spaces. Settings or studios are used for films, whereas studios are used as spaces in television. As a result, while designing scenery, the scenic designer considers audience observing, whereas for film and television, the designer considers what the camera sees.

The existing literature lacks research on the current issues and the problems of the scenic design process in live performing arts, the use of props in contemporary performances, the challenges of the use, transportation, storage of props, and possible solutions with the help of various design strategies, and scenic design in the world and Turkey. Further research is required in the area of using design solutions to deal with these issues, particularly in the context of Turkish and international scenic design in performing arts.

Therefore, this study aims to focus on scenic design in Turkey, to discover the challenges regarding the use, transportation, and storage of props in scenic design, and to suggest several solutions such as modular design, reuse and storage of props, and the use of digital technology in design under the name of sustainability. The study focuses on the challenges regarding the use, storage, and transportation of the design materials and possible solutions to avoid the waste of materials, and how to apply sustainability to the scenic design process.

Methods include interviews with professionals in this field such as digital artists, scenic designers, theatre organizations, and municipal theatres; a survey applied to the selected scenic designers. The outcomes of the interviews explain the scenic design process in Turkey and how it works, the challenges to deal with during a scenic design process, existing solutions for the challenges and how effective they are, the problems to be solved, and suggested solutions from the interviewed professionals and how effective they can be, individuals that are responsible during the process, the possible scenic design developments such as to find the most suitable material use for each prop, to get the lowest cost during the scenic design process in the most efficient way and to apply the sustainability to the scenic design focusing on modular design, reuse-storage, and digital technology in Turkey.

Findings from meetings with municipal and private theatres and interviews with scenic

designers and digital artists show that there are challenges related to the lack of professionals that are working and the budget problems in municipal theatres. Solutions, which are work shared between existing members of a production team, to select plays with low costs, making props in the workshop of the theatre, and reuse them by storing or modifying them are created by the head of the municipal theatre and other individuals. In addition, private theatres have similar challenges, including the transportation of props. Budget, storage and reuse of props are the problems that are in common for both municipal and private theatres. There is lack of awareness of sustainable scenic design in Turkey. There is also lack of digital technology use and awareness in scenic design mainly caused by the cost.

With the help of sustainability, design strategies and digital technology, alternative solutions for material use and design process in scenic design are suggested and these solutions are compared to find the most effective solution with the help of professionals and articles. It is aimed that solutions to be gained from this study may benefit scenic designers, producers and performing artists.

CHAPTER 2: SCENIC DESIGN: DEFINITIONS AND FRAMEWORK

Sustainable approaches that have gained interest in recent years necessitate theory and research-based design approaches and proposals. Therefore, Chapter 2 concentrates on the definitions and parts of scenic design. Scenic design has many integral parts which are evolving every day with the development of new materials and techniques. This chapter examines and gives detailed information about the scenic design, production team, elements of scenic design, production sequence, challenges in scenic design process, props, live performing arts, sustainable design and digital art with the help of previous studies and existing literature.

2.1. Scenic Design

Scenic design is to visualize a specific scene of a performance for the audience by using design strategies. The expression that is aimed to be given to the audience is designed by a scenic designer with the help of production team members. The main design elements for a scenic design are props, lighting, sound, and costumes, which support the visual idea of the specific parts of a performance.

Bergfelder, Harris, and Street (2007), define the scenic (set) design as providing a movie its characteristic appearance, its historical, social, and cultural contexts, together with the material details that go accompanying it, as well as the actual environment that the story will take place in. Beyond these characteristics, sets help character identification, defining and expressing their psychology; and, frequently, when combined with other supporting elements such as sound and lighting, they help with creating a sense of place in terms of mood or atmosphere, thus they evoke emotions and desires that either align with or oppose the narrative. Sets have a defining role in popular formats, like historical drama, science fiction, horror, melodrama, and musical. Sets are also essential in identifying the genre of a movie.

The storytelling of a scene might differ according to several factors. The concept and vision developed by the scenic designer have an important impact on the storytelling. Furthermore, the design choices, including style and aesthetical understanding,

influence the observation and perspective of the audience. The placement of the props and the layout of the space also affect the dynamics of the stage and the audience. The colors and the materials that are used for the design convey specific moods, feelings, and semiotics. Different lighting techniques, brightness, shades, and patterns highlight significant scenes or characters, boost strong feelings, or create certain moods. Sound also affects the performance and audience just in the same way as lighting. The storytelling is also impacted by how time and transitions are represented in the scene design. Narrative flow and consistency can be improved by using temporal components as fluid transitions between scenes (Bergfelder, Harris, and Street, 2007).

Theatre design may split into various areas of specialization, including scenery, costumes, lighting, sound, and projection. Scene, costume, lighting, sound, or projection designer must first understand the complexity of theatre as an art form. Wolf and Block (2014), point out that each theatre form has its own needs. If the form is literary where the spoken words are playing an important part in the performance, the design visualizes the atmosphere where the event is happening at that point when the actors are having a conversation. The musical forms, including musicals or dance performances, have a scenic design which has to be comfortable for the movement of the performers. Because of the bigger moves the musical performers have than the literary form theatre performers, the space has to be designed as the props will allow the performers to move freely. However, literary formed theatres also need a perfectly designed space for each movement of the performers; each second of the performance will be thought wisely and the props will be designed as they will not cause trouble with the movement of the performers.

According to Gilette (1987), scenic design includes stage lighting, decoration, costumes, set construction, and set placement. It is the process of visualizing the script or a visual way of storytelling. Scenic design is related to the representational arts. Its purpose is to bring the mind of the playwright to life. There are several challenges before the design process, during the design process, and after the design process. This thesis discusses the process of the design, the actors and the elements of the design process, the challenges, the issues, and possible solutions to several problems.

Therefore, the scenic design has to reflect each component of the play. Each

component of a play, such as the era of the story, the background, the environment, and the people of that era has to be studied and analyzed perfectly and designed properly. However, there are several challenges for the production team, especially for the designer. These challenges will be discussed in the following chapters of the study. The design process of a live performance needs well-organized teamwork. The organization has important team members and each has important roles. The following section defines what the production team is, who the members are, and how the organization scheme works.

2.1.1. Production Team

The production team is the group of individuals that are working, in any capacity, on the production of a play. The production design team includes the producer, director, and scenic, costume, lighting, sound, and other designers who develop the visual and aural concept for the production. The production concept is the creative interpretation of the script, which will unify the artistic vision of the producer, director, and designers. Production meeting is a conference of appropriate production personnel to share information and the supernumerary is an actor, normally not called for in the script used in a production; an extra; a walk-on (Gillette, 1987).

> *"…The close collaboration of the creative team is an important feature of contemporary theatre, not only in experimental but also in more traditional repertory theatres. Often, it is almost impossible to detect the personal contribution of each individual co-creator while analyzing different elements of a production, as they are entwined and created new hybrid forms."* (Jonīte, 2021, p. 296).

The statement highlights the importance of a well-organized production team. Each member works in harmony although their disciplines and work areas differ. A good play requires good organization. It requires an "artistic responsibility", which means each member of the organization has to satisfy the artistic needs of the member at a higher position (See Figure 1).

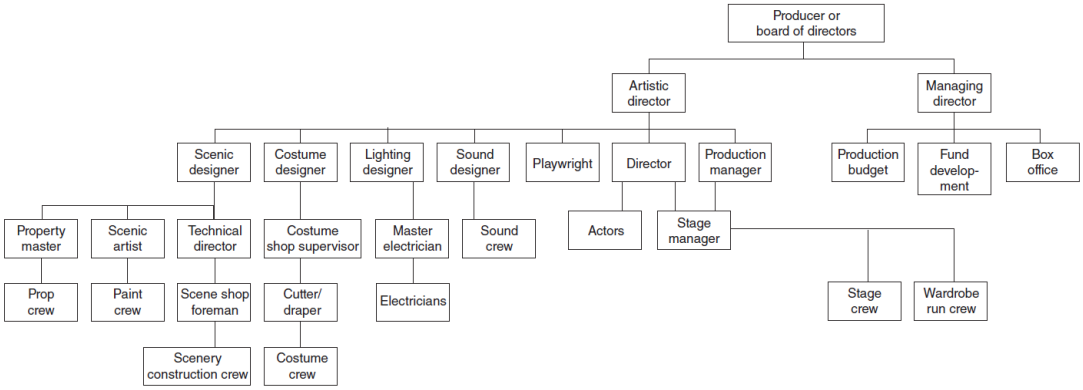

Figure 1. The Organizational Structure Chart of a Typical Theatrical Production Company (Source: Gillette, 1987, p. 7).

2.1.1.1. Producer

A theatre producer is responsible for managing all aspects of a theatrical production, from developing concepts through on-stage management (Stage One, 2023). Producer is the major authority of the production team. They secure the rights and financial backing of the play, hire the production team, and lease the theatre. Art producer works for an art institution, and manages the process of the art project. An art producer should be skilled in woodwork, lighting, sound engineering, and art management in addition to academic art and historical knowledge (Bordelon, 2022).

2.1.1.2. Playwright

Playwright is the link of production chain. They can develop the characters or the scenes and explain them to the director. The plays written by a playwright can be published or taken on by a theatre company to perform. They can also write a play based on a brief from a company. The main responsibilities of a playwright are to create and write a play, write the synopsis (an outline of the plot of a play, film, or book) and character list, to understand and to be loyal to the given brief, to be good at telling a story through words, to be careful for deadlines, to be good at researching and collecting data about the play, to be available and in contact with publishers, directors, and producers, and to be open to revision according to the feedback (Get Into Theatre, 2019).

2.1.1.3. Director

Director is the artistic manager and inspirational leader of the team, they have the vision, energy, and ability to focus on each member of the team. Directors combine each individual component of interpretation into an overall concept, the style of which they are responsible for establishing (Reid, 2017).

2.1.1.4. Production Manager

The annual programs or educational plays that are being played several times have to be run by an organization to select the props for the stage. The technical director handles the scene shop and monitors the production of the scenery for each play, and the property director handles the prop shop and monitors the creation of the props. Production Manager deals with each individual design team. They are responsible for managing the production budget, personnel, calendar; their duty is to keep everything move smoothly. To summarize, production manager is responsible for the budget, includes finding creative ways to keep costs low, scheduling of a theatrical production, and solving issues that threaten to slow progress towards the day of the show (Berklee, n.d.).

2.1.1.5. Stage Manager

The duties of a stage manager are to provide practical and organizational support to the director, actors, designer, stage crew, and technicians during the production process. They make sure that the process goes smoothly. Their responsibilities are to schedule and direct rehearsals, to transfer the wishes of the director to designers and craftspeople, to coordinate the stage crew, the cues, and actors' entrances during performance, and to control the entire show process (AACT, 2019).

2.1.1.6. Scenic Designer

A scenic designer, often known as a set or production designer, creates the visuals of a performing art. The scenic designer decides how the stage will look, the scenic components in light of the cultural background of a written script in collaboration with the director and other designers (Center Theatre Group, 2023). A list of the required tasks of a play, which is called "punch list" is a helpful tool for scenic designers. This list is combination of the given scenarios and production requirements that is useful to express the dramatic atmosphere and the actions of each character in the play. The

designer has to examine every detail that the script requires for the play (Brewster and Shafer, 2011, p. 135). Scenic Designer is responsible for the visual and functional aspects of each scenic element. Any scenic movement may also be animated by them. The designer does sketches or renderings of the set and props, scale models of the sets, and scale mechanical drawings that describe the settings (Gillette, 1987).

2.1.1.7. Scenic and Property Personnel

Scenic Artist is responsible for the painting of the scenery and the paint crew works under the scenic artist and paints the sets and properties. Property Master turns the prop design sketches into working drawings. Property Crew is responsible for tracking, placing, and maintaining all props during rehearsals and shows.

Scene-Shop Foreman is responsible for the construction, mounting, and rigging of scenery. Construction Crew is composed of people who build the various pieces of scenery and properties for the production. Stage crew shifts the set during technical and dress rehearsals and during the performances (Gillette, 1987).

2.1.2. Elements of Scenic Design

Elements of scenic design refer to a variety of elements and methods that improve the visual and auditory impact of a theatrical presentation. Here are some basic elements that are categorized under the headings of tools and materials, scenic production techniques, lighting, costume, and sound (Gillette, 1987).

2.1.2.1. Tools, Materials, and Flats

Properties are categorized under three main headings: set props, hand props, and decorative props. Movable objects like furniture, rugs, floor lamps, appliances, etc. are known as set props. Objects handled by performers, like fans, books, lanterns, cups, and other similar objects, are referred to as hand props. Decorative props, also referred to as stage dressing, are objects that are not directly used by the performers but add to the setting. Curtains, dishes in cabinets, photos, or other decorative elements that add to the scenography are examples of decorative props (Phipps et al., 2019).

There are four primary ways: building, buying, renting, borrowing or pulling. When a piece is not available and cannot be acquired, it can be built or other items can be altered to fit the design. After the designer decides the design of the piece, the crew

builds or recreates it by modifying old pieces. Unfortunately, building props is time-consuming and often costlier than the other options for acquisition (Hart, 2017). After use of these props, they are often moved into the stock collection of the theatre.

If theatres build a relationship with each other, it will be beneficial for both sides since they can borrow props from each other. Using pieces from a collection or stock is generally referred to as pulling (Mussman, 2008). It is beneficial for the theatres to collaborate and borrow props, costumes, and other stage materials from each other. It helps smaller theatres and those with limited budgets save money. Access to the various props and costumes makes way for more creativity and the designer does not limit themselves. During the pulling process, communication between the designers leads them to exchange ideas and creative approaches.

Props can be bought from auctions, consignment shops, retail stores, thrift shops, salvage yards, garage sales, or online marketplaces. Pulling pieces is the process of finding properties already owned and stored by the theatre group itself. Even though buying pieces may be the easiest option, the props still might need to be repainted, resized, or adapted in order to fit within the overall design concept and contribute effectively to the storytelling (Gillette, 1987).

Strawn (2013), states that utilizing the own inventory of a theatre can save money and give quick access to the needed props and costumes. However, if an item is modified, added, or removed, the inventory needs to be updated to avoid confusion and misleading those searching for those items.

Gloman and Napoli (2007), examine flats by their forms: vertical and horizontal. Flats are vertical pieces that serve as backdrops or walls, while platforms are horizontal structures that provide a surface for performers to stand on. Basically, there is a need for a horizontal element for people to stand on and something vertical behind them in order to create an ideal space to tell the stories. Flats are mainly meant to represent walls and they are often shaped as rectangles to imitate the shape of the wall. Flats are simpler versions of walls with less structure, less cost, and less time to build. but there is more to the use of flats. To create scenery that is lighter and more portable than a wall, flats are built. Meanwhile, walls are built where they are meant to be built, flats

are constructed somewhere else than they will be used, and they are stored and set up when it is required (Gloman and Napoli, 2007).

Flats can be grouped in two different ways: by their covering and by their structure. According to their covering, there are two types of flats. Soft-cover flats are kind of like canvas, a wooden frame that has a cloth covering stretched over it (See Figure 2). The advantages of a soft-cover flat are that it is suitable for the use of light. It can be carried easily. It is cheaper (it might differ according to the type of covering). It is easy to paint, and allows the scenic designer to work on it. Because the covering is removable, the wooden frame can be recycled, which helps with sustainability. However, because of the soft covering, it is easy to lose its balance, and it can be a disadvantage that the movement can be seen behind it. It can get damaged easily. On the other hand, hard-cover flats are closer to a real wall because of their construction. Hard-cover flats are more solid and the surface material is hard, which allows the various opportunities to create. In order to discuss the advantages of it, its surface is hard, which allows people to use it without damaging it during the performance. Performer can use force against it or lean against it. The surface allows to use wallpaper, paintings, and many more additional elements. Furthermore, it is heavier and more expensive to build. It is easier to make a new flat instead of repairing a hard-cover flat (Gloman and Napoli, 2007).

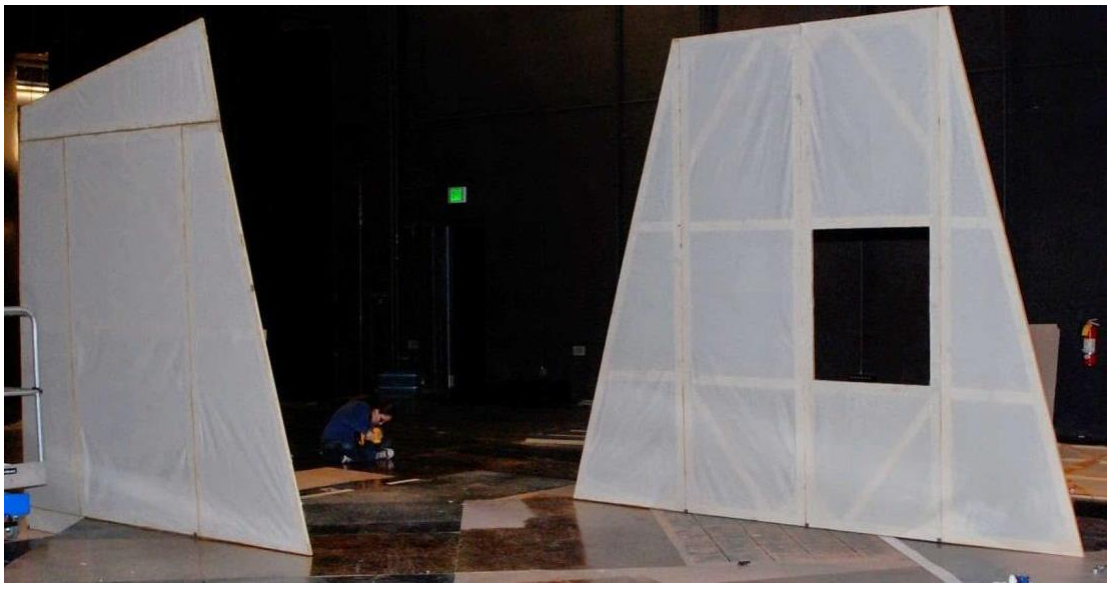

Figure 2. Soft-Cover Flats (Source: HSTech, 2007).

Crabtree and Beudert (2005), examine flats as soft or hard covered. Soft-cover flats are basically empty frames that are covered in velour, muslin, or another material. The most popular material for soft-cover flats is muslin. A thin, rigid skin covers the frame in hard-cover flats. This skin is typically made of inexpensive three-ply lauan. Heavier plywood, wall paneling, composition board, and even rigid cardboard are other typical skinning products. To hide the imperfections and seams of the chosen material, it is better to cover any sheet material with a layer of muslin. No matter how carefully they are fixed, lauan seams are impossible to hide since they frequently crack and show through any paint application. Typically, flat frames are made of steel, aluminum, or wood. The construction methods differ according to the material (See Figure 3).

Figure 3. Examples for Soft-Cover Flat and Hard-Cover Flat (Source: Gloman and Napoli, 2007, pp. 5-6).

According to the type of frame, flats are divided into two types. Standard, in other words, theatrical or *Broadway* frame flats are made of 19,05 mm thick wood that is approximately 63,5 mm wide on its face and whatever length is required for the flat's height and width. Fabric is stretched over the frame, and corner blocks made of plywood are added in the corners and over any other joints. If a hard cover is used instead of fabric, it becomes a hard-cover standard flat, which is thicker. The standard

flats are thin, which makes them suitable for storage back-to-back (Gloman and Napoli, 2007) (See Figure 4).

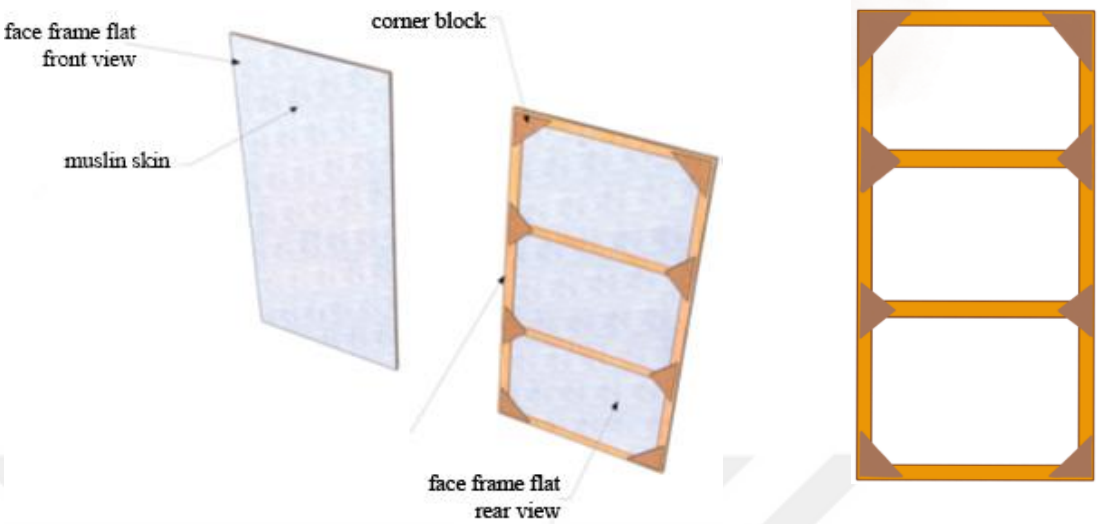

Figure 4. Soft-Cover Theatre Flat (Source: Gloman and Napoli, 2007).

The other type is known as a studio or "*Hollywood* flat frame". It is mostly used in movies and television shows. The frame is made with the widest part of the board (approximately 63,5 mm–88,9 mm) facing out and the thinnest part of the board facing the covering. In this way, the flat resembles an open box. These flats are mostly covered with plywood with a thickness of 3,175 mm –6,35 mm. *Masonite* is a kind of hardboard made of pressed wood fibers, and *luan* is a flexible, thin plywood used for covering flats, also known as "doorskin." Also known as Philippine mahogany. Use is declining due to the fact that it is sourced from environmentally unsustainable resources in the Brazilian Rainforest (Gloman and Napoli, 2007) (See Figure 5).

Figure 5. Hard-Cover Theatre Flat (Source: Gloman and Napoli, 2007, p. 9).

2.1.2.2. Lighting

Lighting plays a crucial role in creating atmosphere and directing attention in a production, offering a versatile tool for adjusting color and shaping scenic elements. A skilled lighting designer can use lighting, which is essentially theatrical, to illuminate actors and sets and generate the ideal atmosphere and tone for the audience. Viewers are frequently oblivious to the subtle manipulation that lighting design is causing. The lighting designer must be given lots of oppurtinities to use the aesthetic potential of theatrical lighting, and the scenic designer must be aware of those possibilities (Wolf and Block, 2014).

2.12.3. Costume

The costumes should fit the overall design concept of the playwright and reflect their vision. They are important in presenting different personalities of the characters and emphasizing their relationship to the theatrical setting. To ensure that the costumes merge in with the other design elements and further the intended aesthetic goal, the

color, line, and historical style of costumes should be carefully studied (Wolf and Block, 2014). According to the Victoria and Albert Museum (2016), to survive the stress of a performance, costumes must also be extremely well made, and many of them show the signs of a long life. In contrast to successful theatre productions, where costumes are worn every night for months or years, fashionable clothing may only be worn a few times. The costumes must be strong enough to endure rough handling, quick changes, theatre dirt, nervous sweat, and the intense heat of the stage light.

2.1.2.4. Sound

In theatrical productions, sound is important to help set the stage and improve the action as it happens. Similar to lighting, it has the power to establish and shape the mood of a scene, frequently doing so subtly and outside of the audience's consciousness (Wolf and Block, 2014). The process of producing and modifying audio components for a theatrical play is known as sound design. It might be speech, music, or sound effects. The term volume refers to the loudness or softness of sound. The frequency of a sound is the pitch that it has. The tone color of the sound is known as timbre. Different timbres can be produced by various instruments or vocalists. The location of the sound is called spatialization. It can give the stage a feeling of depth and spaciousness (APAC, 2023).

2.1.3. The Production Sequence

Design process is a way of finding some solutions to several problems and answering some questions.

As it can be seen in the schema, the design process has several steps, however, it is not linear, the steps are integrated, and it is possible to go back and forth between each step. Once the problem is described, the challenge of the design solution process begins.

The first step of a design process is to define research areas and gather information. The production style, concept budget, and schedule must be well examined and explained to the production team. The script is read by the scenic designer to figure out how to design the scenes in their own creative style and how many scenes there will be. During the process, every idea or outcome has to be criticized to find the best

solution. Historical and socioeconomic background research has to be done, and the environment should be analyzed for the scene. Sketches and models are done, and the colour scheme should be decided by the designer. After that, the implementation process starts by planning how to apply the design on real life scale. As soon as the evaluation by the production team is done, the design process ends (Wolf and Block, 2014) (See Figure 6).

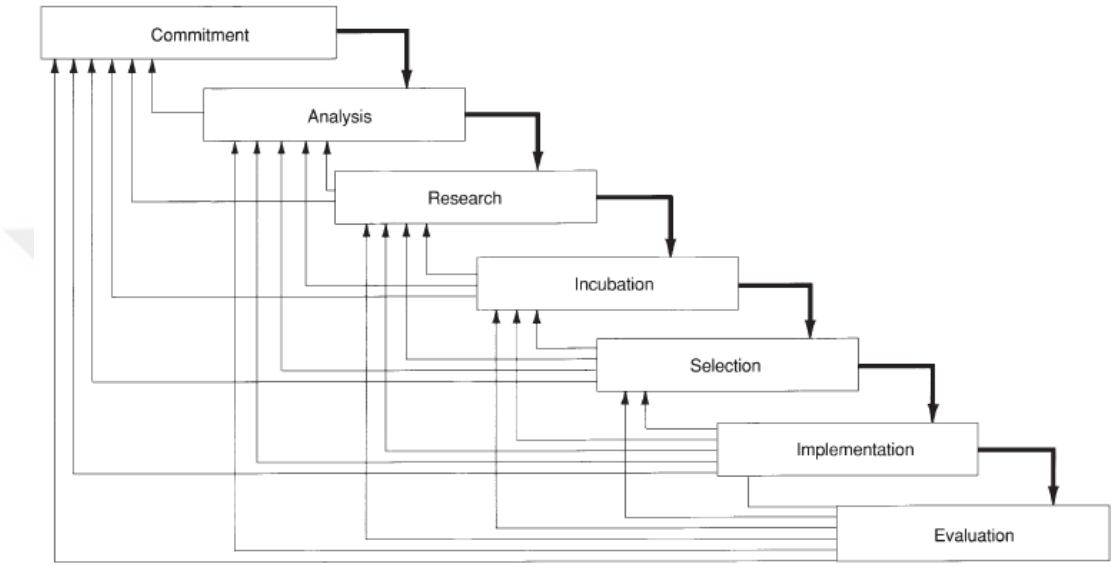

Figure 6. The Design Process (Source: Gillette, 1987, p. 23).

2.1.3.1. Script

Every performance starts with an idea. The next step is to develop the ideas into the concepts. However, while some of these concepts turn into a written script, others stay as concept and develop during the design process with the help of producers, designers, and artists.

Theatre performances either begin with a scripted text or with a creative concept developed by the performing cast. Some concepts become written scripts, but others remain just conceptual, allowing actors to improvise dialogue during live performances (Wolf and Block, 2014).

2.1.3.2. Concept and Construction

The process starts with selecting the script. The producer hires the director, designers, and actors after they secure the legal rights to produce. After that, the production

concept is developed by the production design team. The production concept is the outline of the artistic vision of the production team. The concept helps to develop the idea around the design ideas of the design team. After the concept is decided, the team starts to work on the set, props, lighting, costumes, and sound. The team sends the diagrams, sketches, and plans to the places for construction, fabrication, or acquisition of the production elements. During the building progress, the directors and actors rehearse.

According to Wolf and Block (2014), once the production concept is established and agreed upon, the design process for sets, props, lights, costumes, and sound begins. This involves creating various diagrams, sketches, and plans, which are then sent to specialized shops for the construction, fabrication, or acquisition of the required production elements. They also state that the design concept is the foundation of good design applied to the stage. The implementation of design involves technical production, exploring building methods, and installing and moving scenery on the stage. For the stage, different types of scenery, scenic construction, and painting; management of scenery, props, and stage effects; and the best equipment and materials are utilized.

2.1.3.3. Rehearsals

Technical rehearsals work as the actors rehearse with props, lighting, and sound. Each movement on the stage or behind the stage has to be choreographed according to those design elements. The timing of all scenic and prop shifts has to be choreographed perfectly with the help of shift rehearsals to avoid any failure during the play.

Gilette (1987), mentions in his book that an important phase in the making of a musical is the entire technical sound rehearsal, or sitzprobe. The actors and orchestra pair up for this rehearsal to sing and play through the music while seated (the term "sitz", which means "sit" in German). The main purpose is to establish the basic balancing levels of the space between the orchestra and the wireless microphones of the performers.

This practice helps detect any possible sound problems or difficulties that might need to be solved before the performances. Overall, the sitzprobe is a crucial technical

rehearsal that helps to make sure that the audio experience in the musical performance is flawless and well-balanced for both the artists and the audience. It allows the sound crew to perfect the sound design and produce an ideal acoustical setting that raises the level of performance as a whole. The dress rehearsal starts at the end of "tech week". The lighting and sound rehearsals may continue and get modified according to the needs during the final full rehearsals (Gillette, 1987).

2.1.4. Scenic Design Process

Scenic designer schedules a meeting with the producer and listens to their ideas and wishes for the design. Script is read several times, and notes are taken by the scenic designer to find out the theme and specific needs. Designer does research on the play, the era, the character anthropology, and materials. They decide the calendar and deadlines with the production team. Attendance at all meetings and transfer of all information and ideas to the stage manager are very important. The ideas can be discussed and different perspectives can be taken from other professionals. The next step is to sketch the ground plan and make free-hand or digital 3D models to express the design idea to the production team. Revisions according to the feedback are necessary and beneficial for the process. Deciding the furniture plot is the next step. Designer has to identify which pieces are present, which are to be rented or borrowed, and which need to be built. He/she is responsible for finding the furnishings. Technical and detailed drawings in scales have to be done that have a ground plan, centerline section, composite and furniture plans, platforms for the main deck(s), front elevations of large wall surfaces, front elevations of additional masking or secondary walls, additional scenic items in order from largest to smallest, backdrops and cyclorama walls referred to as a cyc wall, which is a curtain or wall background stretched tight in an arc, usually in the back of a stage set or theatre to create the illusion of a clear background (Maio, 2019) (See Figure 7), built furniture pieces, and properties. According to the budget, the drawings will be revised. Regular meetings with designers and the members of production team that are in charge of the stage are necessary. The designer prepares the list of set dressings and goes to prop storage to see if props are ready to use. With this information, designer decides which props should be built. Designer attends the first rehearsals and sees if there are any problems or things that need to be fixed. The color scheme and the materials that are used are discussed between each designer to be in harmony. Daily visits to the stage are

beneficial to take feedback from the director, the technicians, other designers, and performers to make sure that processes are proceeding in the right direction (APPSTATE, 2017).

Figure 7. Cyclorama Wall (Source: Peerspace, 2023).

The director shapes the scenic design process according to their wishes. The director may want a realistic or surrealistic design. The designer considers both the scene description and the wishes of the director. After deciding the concept and theme of the design, the designer decides which materials they will use. It can have a complicated or very basic design. Not only the designer or the director but also the production team have a big role in the design process.

The work is divided into three parts; first, the design concept of scene design as a visual art and its function in the theatre; second, the execution of the design, involving all aspects of technical production; and third, stage lighting as a design element and theatrical technique.

The scenic designer, Karakaya, explains the scenic design process as the written script is read by the production team and the designer decides the design according to the needs of the producer in light of the script. After thorough background research, design elements are selected by the designer. The designer also decides the materials that will be used and how to build them. After the design is done, transportation is also an important part. The design has to be designed in the most suitable way for transport.

The vehicle that will be used is also important; the fewer vehicles that will be used, the better. The design gets installed, and the lighting and sound check get done by the professionals. The lighting and sound must be checked by the professionals during performance as well. After the performance is done, operators take down the design and load it on the vehicle. The storage of the props is one of the most challenging parts of the design process. This article is focused on the storage of the props, especially theatre flats.

In the representational arts, a good performance depends on a good design. A written work needs a well-planned design and organization to become a visual art. Every detail and the meaning of every word from the script should be well analyzed and the correct way to turn it into a representational art should be decided by professionals.

The process of making a scenic design offers a number of challenges for designers. These challenges can develop at various phases of the process and require real consideration and problem-solving. Major challenges in scenic design include:

One of the very first challenges is conceptualization. It can be difficult to create a concept that is both unique and harmonious, matches the vision of the director, and reflects the true intent of the production. Understanding the performance, its ideas, and the intended atmosphere are required.

As the municipal theatre stated, budget limits are another challenge in scenic design that can have a big effect on the creative process. Designers frequently have to work under a limited budget, which forces them to be creative and come up with new ideas in order to achieve their design vision. Designers must carefully analyze and arrange design components according to their importance and impact on the entire production in order to work within budget limits. This includes selecting critical focus points or visually attractive components that can successfully express the intended feeling or idea. Designers can create a visually appealing design within the budget limit by wisely selecting resources. Designers can also design with low-cost building materials and methods without sacrificing the quality or attractiveness. This can be provided by the use of recyclable or recycled materials, collaboration with technical teams to find affordable solutions, or rental or borrowing opportunities for specific props or set

pieces. Managing budget limits also requires open communication with the production team, which includes directors, producers, and technical staff. Early budget discussions allow designers to match their ideas with the resources available and come up with creative solutions to increase the effect of the design. Additionally, designers can use their creativity to think outside the box and discover new solutions that can be produced without going overboard with budget. This can include discovering uncommon materials, researching various design concepts, or exploring alternative production techniques.

Practical factors are very important in scenic design because they include many different issues that guarantee safety, functioning, and productivity. When designing a performance, designers must carefully consider elements like transitions, entrances and exits, and technical needs in order to provide a design that supports the flow pattern. This includes sets and props that allow smooth transitions and actor movement. The design must also harmonize with safety guidelines and requirements to offer a safe workplace for performers and staff. Scenic designers make sure that the show runs efficiently and successfully by considering practical factors, which improves the entire experience for both the cast and the audience.

The scenic design process is impacted by time limits, which require designers to efficiently manage their time in order to meet task deadlines. The development of a concept, research, sketching, and finalizing building plans are some of the phases that make up the design process. Designers must examine the overall project timeline and provide enough time for each phase. To complete the design in time, the requirements include setting achievable goals, setting deadlines, and prioritizing work. Designers who manage their time well are able to maintain a productive process, work well with other team members, and handle any unexpected challenges that may arise. By obeying the deadlines, designers can deliver their work within the given time.

It takes a combination of creative insight, technical expertise, problem-solving abilities, and effective communication to deal with these challenges. Experienced designers treat problems as opportunities for development and creativity since they are aware that challenges are a necessary part of the scenic design process.

Small theatres face several difficulties. The purchase and storage of props is one of the issues. Props can be obtained in a variety of ways, including by building, renting, buying, and internal collection (Gillette, 1987). Each method has unique difficulties. Theatres keep an internal collection of props collected throughout time because buying them can be a time-consuming and expensive process (Strawn, 2013).

Meanwhile, some stage design processes have a strict schedule that offers various tasks to be completed by the opening night of the show, while others have a flexible schedule that offers months to complete the design. In both cases, the designers need time to find the right props. Besides time, the designers need a budget to acquire the props.

2.2. Props

The word “prop” is the short term for ‘property’ and is any object used in a performance. “Prop is defined by the OED as “any portable article, as an article of costume or furniture, used in acting a play: a stage requisite, appurtenance, or accessory (Sofer, 2010, p. 20). Props can be anything, from small to large items.

> *“The earliest known use of the term "properties" in English to refer to stage accessories is in the 1425 CE morality play, The Castle of Perseverance.”* (Wikipedia, 2023).

The Oxford English Dictionary finds the first usage of "props" in 1841, while the singular form of "prop" appeared in 1911. Some experts, however, seem to think that the term comes from the idea that stage or screen objects "belong" to whoever uses them on stage.

Prop can be anything from the objects the performer holds in their hand to any piece of the whole stage that is used to help the scenic design and the performance. It can be part of the walls, floor or even ceiling. Props (Properties) Furnishings, set dressings, and all items large and small that cannot be classified as scenery, electrics, or wardrobe, and with which actors interact. Props directly handled by actors are known as hand props, props which are kept in a costume of actors are known as personal props, and a hand-held practical prop used by an actor for a specific purpose is called action props.

Antiquarianism is a movement focused on historically accurate scenery and stage equipment. Stylized sliding wing flats were replaced by complex box sets that included furnishings, architectural details, and other items that were appropriate for the time period represented in the performance. In Europe, antiquarianism entered theatres in the latter half of the eighteenth century. Sets, costumes, props, and sound and lighting equipment are moved from one location to another using lorries that are at least 40 feet long. Several businesses specialize in transporting theatrical and musical shows across the nation and the globe. The assistant stage manager is in charge of placing the props of sets as well as operating a pre-show checklist to make sure everything is in the correct position and that the furnishing is properly placed before the performance starts. Foam core is known as Foam Board (5 mm thickness). To attach photographic prints, to function as the backing for picture framing, to create scale models, and to paint, foam core is a portable, readily cut material. It is composed of a polystyrene foam board covered on both sides with thick paper. Scenic designers commonly use these materials to create set model boxes because cuts are simple to maintain straight and parts can be glued together to create complex designs. Get-in process involves bringing the set, props, and other equipment into the theatre. Although the phrase "Mise en Scene" literally translates to "placing on stage" in French, it refers to much more than just the scenery for a performance or event. The phrase refers to all of the visual elements of a scene, including the set design, lighting, costumes, and props, as well as how the details might help tell the story. A prop room is either a room where the collection of props is stored, or a backstage area where the props are kept and are waiting to be taken by the performers. Propping is the process of traveling around and locating, borrowing, purchasing, or constructing props for the performance. This duty is frequently carried out by stage management or the scenic designer in a small company. A detailed documentation of the source of the props must be maintained in order for them to be successfully returned at the end of the performance (Theatrecrafts.com, n.d.).

A prop can be an object with which the performer interacts to express the scene in the most effective way to the audience, performer can hold it, use it, eat it or break it during the performance. Broken or eaten props are replaced in each performance. These needs require several techniques. While making or selecting props, security is the main issue. If the play requires fire or related objects to fire, with the help of technology, the prop

selection has to be done wisely. A real candle, torch, or fire in a fireplace is rarely permitted in the theatre for safety reasons, so specialized electrical objects known as ‘practicals’ are purpose-made. In addition, if a prop breaks during the performance, it also has to be safe for everyone in the place. For example, real glass is never used, and a chair is built to break apart into parts with ease. And yet everything looks strikingly realistic to the audience.

Common objects, such as furniture and some of the set making equipment (theatre flats), can be stored to be reused directly or modified for different performances. However, some of the productions are built just for specific performances that cannot be used in other shows. It must get the permission of the designer to use it in another show. Unless it is the set design of the same designer, it is almost impossible since it is the signature of the designer (Cash, 2022).

Stage managers, workshop staff, designers, and prop makers in professional theatre, dedicated part-time workers in amateur companies, and art or craft students in schools are just a few of the people who produce stage props.

Wilson (2003), states in his book that there are people who take part in prop-making process. As the head of city theatres will mention in the following part of the article, although some of the theatres, especially private ones, have their own designer and a whole team for props making, occasionally the theatres do not have a special team to make the props, and consequently, it gets harder to use smart design ideas and deal with the challenges during the design process. Wilson also states that besides the shortage of time and funds, those taking part in the design process have one thing in common, which is to rely on materials and techniques they are familiar with and equipped to meet all the different challenges that arise. It has to be known how the materials behave and how to manipulate them. Otherwise, it is not possible to produce something, calculate the costs, plan the time, and predict how things will work.

Symbolic items served as props for the civic identity of Athens. These items could be carried into the theatrical frame both practically and conceptually. They functioned as points of connection between civic life and the stage when used as performance props. The civic symbolism of an item could be used for dramatic effect, and how it was

handled on stage had an impact on what it meant to society. Therefore, the way that theatre handled these props contributed to the civic ideological discourse that influenced citizen identity. The complex nature of that discourse and the participation of the theatre in it are reflected in the discussion and revision of the meanings of objects on stage across various dramatic genres. The analysis of a few of these items that represent civic life sheds new light on the dynamic between theatre and civic ideology. The study emphasizes the importance of considering both iconography and intergeneric interactions while understanding this dynamic (Wyles, 2020).

2.2.1. The Selection and Design Process of Props

Props can be bought, borrowed, or hired, but some will need to be made or altered. While the decision to use a certain prop in a show is purely artistic and depends on the director and the designer, the question of how to purchase it may also be logistical and budgetary, and is likely to involve the production manager or the stage manager, the designer, and the prop maker too, if it is possible or obvious that the prop needs to be made (Wilson, 2003).

The design process of props starts with the prop designer analyzing the written script. The visual and functional requirements of the props should be well understood from the script. How many props are needed, what their impact is on storytelling should be clear in the mind of the designer with the help of descriptions. The communication between the prop designer and other design team members needs to be fluent to understand the design language of each other better and to be in harmony. The designer does research on the time period and building guidelines of the intended props. After wide-ranging research, the designer collects data on existing props to rent or borrow. If a new prop has to be built, the designer decides the design concept and building technique. The designer decides which materials to use for the building of the props. Durability, safety, authenticity, and aesthetic appeal are all taken into consideration. If building a prop is necessary, the designer contacts the artisans and prop makers. Another option for renting a prop is to contact the prop houses and suppliers. The props get tested in order to make sure they are functioning and safe before the performance.

2.2.2. Transportation of Props

The transportation of the props between the places such as storage, the rehearsal place, and performance venues has to be done safely. The props are packaged properly to avoid any damage during transportation. There are several products that can be used for protection, such as protective cases, padding, bubble wrap and more. Each package has to be labeled to provide information about what is inside. Any warning about the props should be noted to protect their safety. The selection of the vehicles that transport the props depends on the size, number, and features of the props. Meanwhile, small vehicles can be enough for small companies, some of the productions need to rent trucks, vans, and even shipping containers. The designated team for loading and unloading should be careful to avoid any damage while carrying. The temperature and humidity of the vehicle should be controlled during transportation. The transportation, loading, and unloading must be done in time to avoid any possible delay.

2.2.3. Storage of Props

The storage of props is highly required in order to avoid the waste of stage materials and keep them for reuse in other productions. Therefore, it decreases the unnecessary use of materials to build a new prop every time.

The Turkish scenic designer Serkan Kavurt (the scenic designer of the Tatavlada Son Dans) states that each production has its own storage of props. The production stores the props considering the reuse of the props or the materials that the props are made of, such as fabrics, metal structure and more.

The organization of the storage has to be well designed for easy access to the needed props. The other purpose of the prop storage is to avoid the mess of materials in working fields. Props are stored in a variety of sizes, from the smallest ones to huge flats. There are different ways of storing. The most common storage type is the shelf system for each type of prop or the box (Punished Props Academy, 2018).

One of the most common ways to store props is to have a prop table at the backstage and store the props on it. There are boxes and labels on them that describe the features of the props in them. After the show, the performer is responsible for returning the prop to the appropriate place (Youtube, 2012).

2.2.4. Waste of Props

Mimi Lien, a set designer, states that as a play ends, the entire set tends to be thrown in a dumpster, which always feels like such a tragedy. It is a hard time throwing anything away for her, and she thinks that this is maybe the curse of the designers; they believe that every little thing can be potentially useful or keep things and try to reuse things as much as possible. On the other hand, according to Beowulf Boritt, a set designer, theatre is inherently not a very eco-friendly art form. Sets tend to be thrown away at the end of a production. Everybody tries to be sustainable about it, and he states that he tries to save material, but because designs are custom-made for a particular production used in a particular way, a lot of it gets thrown away, and he feels bad about it (Youtube, 2015).

Props waste is the term used to describe the incorrect treatment and disposal of props used in theatrical productions in the context of scenic design. This may involve storing an excessive amount of unneeded or extra props, as well as treating and throwing them improperly after use. The waste of props can be caused by several reasons.

What is Hollywood doing with props to cut waste? The Materials Oasis is a warehouse in Los Angeles that appears to be an area for sorting for the biggest charity shop in the world. Vases, couches, artwork, fake plants, sand bins made of plastic, wall pieces, and even bundles of packing paper and more are in this warehouse. However, these goods are not for sale. The items supplied here are all leftovers from the film and television industry and are being given away for free to other filming projects, charities, educational institutions, or anybody else who may utilize them. The operator of The Materials Oasis, EcoSet, additionally supplies set services to help productions in achieve the zero waste standard of 90% waste diversion from trash or burning (Ro, 2022). Additionally, prop waste in scenic design can be decreased by using eco-friendly materials, taking sustainability and reusability into consideration when making props, and implementing effective storage and organizing techniques. To sum up, scenic designers can decrease waste, lower resource consumption, and encourage an eco-friendlier approach to theatrical productions by using sustainable techniques and conscious management of props.

2.3. Live Performing Arts

From the simplest street performance, costing zero dollars to produce, to a large-scale stadium spectacular costing hundreds of thousands of dollars, it can all be clarified as live performing art. The common aspect is spontaneity which creates a live connection between the performer and the audience (Bowland, 2019). As the live performing arts provide real-time activity to the audience, the presentation has to be transferred to the audience in a perfect way. Accordingly, the scenic design and the props that are used for the performance are two of the most effective elements of the presentation. If the scene is well designed, the audience perceives the idea behind the performance efficiently. Therefore, the scenic design has a critical role in a live performing art.

Auslander (2008), in his article, states that the traditional and unreflective assumptions to describe the "liveness" in live performing arts as magic have to be changed, and it is actually the "energy" between the performers and spectators in a live performance and the "community" that live performance is often said to create among performers and spectators. These concepts have real value for performers in live performance. In conclusion, the common assumption is that the live event is real and the mediatized events are secondary and artificial reproductions of the live performances. The live performance happens in real time, and the interaction between the performer and audience is real. The performer does their best to make the audience experience the performance in the most efficient way. Experiencing depends on the performance of the performer, the atmosphere, each property of the place such as the heat, the smell, the size, and more; the mood of the audience, the time of the performance, and most importantly the scenic design. The design of the stage where the performance is happening is as important as the performance itself. The scenic design either maximizes the impact or lowers it. Therefore, an effective scenic design by a professional team means a good performance.

As Auslander (2008) stated, the television camera chooses the perspective for the audience. However, the observation of the audience during a live performance is directed by the audience themselves or the movement of the performer; the observation of the audience during a TV show is directed and manipulated by the director as the director decides the camera angles and the scene order. This forces the scenic designer of a live performance to do a perfect design that will be understood from any angle at

any time.

Any performance is a visual experience with scenography that cannot be separated from performing arts. A performance reflects the cultural society or the environment in which it takes place. Practitioners and academics have been discussing the connection between scenography and performing arts since Renaissance (Auslander, 2008).

Scenic design is a discipline that creates the perfect possible space for a performer in the light of a script. The better the space is created by the designers, the better the performers get into the play and reflect it on the audience.

> *"Good theatre, whatever the form, is about telling a story. In live theatre, the personality of the actors, the physical form of the space, and the dynamic of the audience itself all affect its success. The challenge is to tell the story in an exciting, intriguing, and provocative way."* (Wolf and Block, 2014, p. 28).

One of the ways to create a good performance is to create a good physical form for the space.

2.4. Sustainable Design

Shedroff (2009) states that an approach to design and development known as sustainability sets a focus on environmental, social, and economic factors. Sustainable solutions aim to improve the various systems that support our way of life, including the effective use of natural resources, efficient use of capital and markets, and reduction of pollution and waste in the environment, all without negatively impacting people all over the world. Sustainability highlights practical, cost-effective solutions that benefit people, the environment, and companies.

Sustainability increases the quality of life for humanity while protecting nature and environment by reducing the unnecessary use of resources and the pollution caused by the overuse of nonrenewable sources. The integration of sustainability into human life not only benefits the present but also helps future generations.

According to Shedroff (2009), sustainability can be examined under five main topics which are reduce, reuse, recycle, restore, and process. The methods for reducing material and energy use are the main focus of the reduction part. It starts with designing or redesigning process because reducing the use from the very beginning has a big impact on sustainability. Reuse focuses on methods that make products, services, environments, and mechanisms last longer to avoid unnecessary production. The life span of these elements can be extended by using smart design and engineering strategies. To develop products that are more easily recycled helps to prevent the unnecesssary use of raw materials. However, something being recyclable does not mean that it is actually recycled. This process has to be controlled to make sure the production process is suitable for recycling the product. The use of a sustainable product or service is impactful; however, the storage is just as important. There is still a lot of work to do in order to make changes for the effects we have had in the past, in addition to reducing the impact the actions will have in the future. Once awareness of the methods is provided, it has to be known how to include them in the daily processes.

Hart (2017), approaches sustainability as an essential requirement. In many ways, the field of props is currently environmentally friendly. The props that would be thrown away are mostly kept and stored for future use, and especially for those who are working in low-budget productions or educational settings, recycling, reusing, repurposing, and upcycling materials are required.

> "*In our world it is extraordinarily difficult to be fully sustainable, but it is always possible to be more sustainable. Look at the products and materials you buy. Research and test those that are better for the environment. Consider all aspects of your carbon footprint; often, using a local product is more environmentally beneficial than shipping in a "greener" alternative. As you plan out the props for a production or event, think of what will happen to them afterward. If I know I can use a prop in future shows, I will build it out of nicer and more durable materials. If I think I can reuse any of the materials, I might construct it so it can be disassembled or easily cut apart.*" (Hart, 2017, p. 22).

2.5. Digital Art

In the modern world, the success of a performing art is connected to varying degrees of technology and innovations that are used in the design process. Greenberg and Rague (2021), state that Modern theatre design is deeply connected to innovative electronics and software.

The use of technology in live performances occurs by incorporating technology directly into the performance, including interactive costumes, performer-controlled sets, lighting, or sound. The many various types of interactive art define the differences between participatory art and collective art practice, where "the audience' or visitors' participation is considered as a necessary and fundamental element for the existence of the artwork," and interactive art, which allows the "audience" to influence and shape the content or form in real-time (Nicholas, Daffara, and Paulos, 2022, p. 2027).

The article "Expanding the Design Space for Technology-Mediated Theatre Experiences" by Nicholas, Daffara, and Paulos (2021), studies the co-design process with expert theatre practitioners. Design projects that included AR applications served as the foundation for the study. The Augmented Playbill, a playbill for a theatre production that uses AR technology, is the first work. By scanning the page, it directs the viewers to educational websites.

As an example, the Augmented Playbill shows a scene from a play when scanned by the phone app, including effects and costumes that were unable to be achieved in the live, stage production itself (See Figure 8).

Figure 8. One Particular Page of the Augmented Playbill (Source: Nicholas, Daffara and Paulos, 2021, p. 2032).

Daito Manabe is a Japanese artist, interaction designer, and programmer. The works of Manabe, which include a wide range of disciplines, take a fresh perspective on ordinary objects and events (Daito Manabe, n.d.) (See Figure 9).

Figure 9. KAZU Come Behind Me, So Good!, Official Video by Daito Manabe and Kenichiro Shimizu, Adult Baby Records, 2019.

CHAPTER 3: SCENIC DESIGN HISTORY AND EXAMPLES

Theatre has always been evolving.

> *"During the 20th century it faced significant changes in its literary, physical, and theatrical form; these reflect evolution in the views of society as well as advances in technology. Multiculturalism and globalization have enabled us to understand and appreciate the lives of those with different backgrounds."* (Wolf and Block, 2014, p. 27).

The need for inclusive theatres caused the audience to get involved both physically and emotionally, which created a need for new theatre forms. Other expectations made wider venues acceptable for performance spaces. Theatre has been influenced by television and film. Computers and digital technology have had the most profound impact. Technology has provided complex physical movements of scenery and light. Each performance is a visual experience, and it encompasses three dimensions that reflect the cultural identity of the society that is watching it.

According to Oddey and White (2006), the evolution of space and the ways in which spaces have been used have also improved our understanding of what defines a good place for performance.

The core of a performance that is intented to be given must be supported by a well-designed stage. The scenography cannot be thought of separately from the performance. Therefore, practitioners and academics have been discussing this topic since the Renaissance.

3.1. Scenic Design in History

From the early ancient ages to the modern ages, performing arts have taken an important place in human life.

3.1.1. Scenic Design in the Ancient Period

The ancient Greek and Roman theatre had a fixed architectural form. The stage is in the center, and the audience is placed in an arc around the stage. The plays of Shakespeare were mostly written as the performers entered at the beginning and exited at the end of the play since there were not scenic or lighting strategies. Revival of the Elizabethan stage form, which is an open stage form in which the performance space pushes into the audience, and scenic components are generally more sculptural and less complete. Asian theatre also has a fixed architectural, non-scenic form. This form of theatre does not have any scenic elements (Klingelhoefer, 2017).

According to Crabtree and Beudert (2005), there is not authoritative record of what painting was like in Greek and Roman theatre. Scenic painting became a key decorative and dramatic feature in practically all of Western theatrical history after it was introduced to the stage for theatrical purposes. Stage decoration has continually explored the exotic, weird, and magical stage image through painting as it has advanced over the centuries. The basic visual link between the audience, actors, and painted backgrounds has not changed in the 2,400 years between classical Greece and the present, despite significant changes in theatre building types and stage technology.

Since ancient Greece, the basic layout of a theatre has not changed much: a raised stage for actors (logeion), a lower area for a chorus or musicians (orchestra), and a raked seating area for the audience (koilon). The ancient Greeks developed these fundamental components to the point where every seat in the theatre offered excellent sightlines and acoustics. Ancient theatres were capable of housing 20,000 people, which made the structure not only important culturally, but as a social destination as well (Artsedge, n.d.).

The idea of a producer was developed by the Greeks, just as were many other aspects of theatre. A strong sponsor, or chorēgos may have played in ancient times. The best chorēgos, who would invest the most in their plays, were sought after by authors. The chorēgos was essentially a producer and financier combined in the modern era. Among other things, he would be in charge of paying for the training of the chorus, coordinating their costumes, and constructing the backgrounds and sets. He was a well-respected Athenian citizen. He frequently hosted a grand feast for the entire cast and

playwright if his play won (Kanoria, 2018).

In a way that had never been seen in Greek theatre, Roman theatre was based on public taste from the beginning. The festival manager was required to repay a portion of the audience's financing if a play did not do well. As a result, even throughout the Republican era, there was a certain amount of pressure to give the audience what it wanted, which turned out to be sensational and spectacular. Dramatists and actors were tempted to adapt their style of presentation in response. In order to appear larger than life, the players started wearing larger masks and built-up shoes (cothurni). Long animal processions, gaudy costumes, and elaborate effects were used to fill out some of the few tragedies that were produced, emphasizing the emptiness of both the theatre and the audience (Rea, 1999). The need to fill the emptiness of the stage and enhance the effect of the play brought out the need for alternative solutions, such as the use of props.

3.1.2. From the Baroque Era to Twentieth Century

Proscenium stage form was developed during the Baroque Theatre period following Renaissance developments, and it is still commonly used. In this form, the stage is placed, thus the audience sees it through a frame that narrows the viewing angle.

To try more naturalistic settings, the practitioners of the modern movement developed technical innovations in playhouses that would become fashionable at the end of the nineteenth century in England and America and new technologies such as revolvers, hydraulics, lifts and flying systems in Germany and Austria. Adolphe Appia and Edward Gordon Craig developed some innovative scenographic ideas. Adolphe Appia, a Swiss architect, stage designer, and theorist of stage lighting and décor, lived from 1862 until 1928. His ideas and practical applications revolutionized scenic design, and he had a significant impact on the growth of the performing arts (See Figure 10). For Appia, the four primary scenic elements were: Painted Scenery (Vertical); Spatial Arrangement (Floor); the Actor; and the Light. The performers and the script were equally important to the scenery. Significant advancements in the realm of scenic design during the course of the twentieth century increased the potential of performance spaces (Lucarelli, 2013).

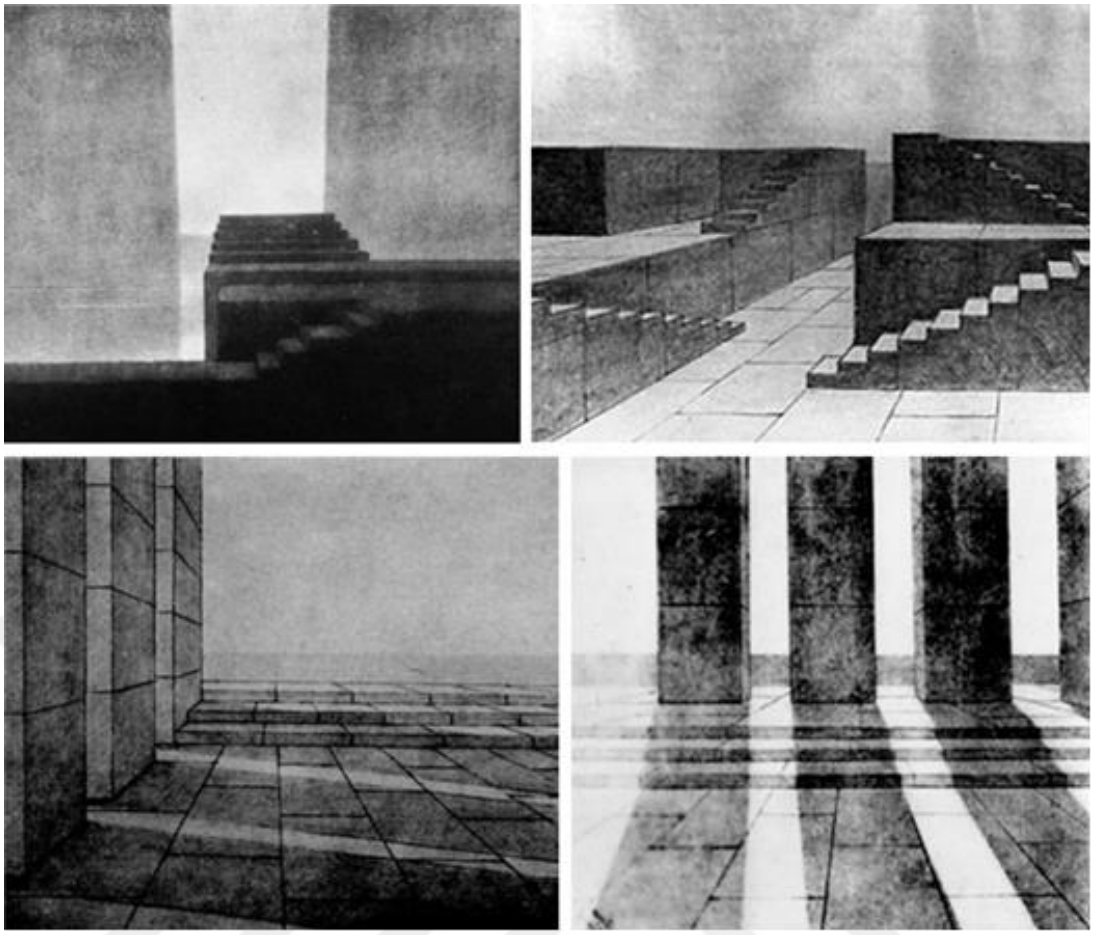

Figure 10. Some of the Drawing of Appia (Source: Lucarelli, 2013).

The contructivists Meyerhold and Tairove developed modernist trends and helped the transformation from conventional realism to symbolism (See Figures 11,12, and 13).

> *"For Meyerhold's production of The Magnanimous Cuckold in 1922, Popova did not paint a set in a pictorial sense but built a construction, an autonomous installation that could function anywhere, in the street or within a building."* (Oddey, White, 2006 p. 13).

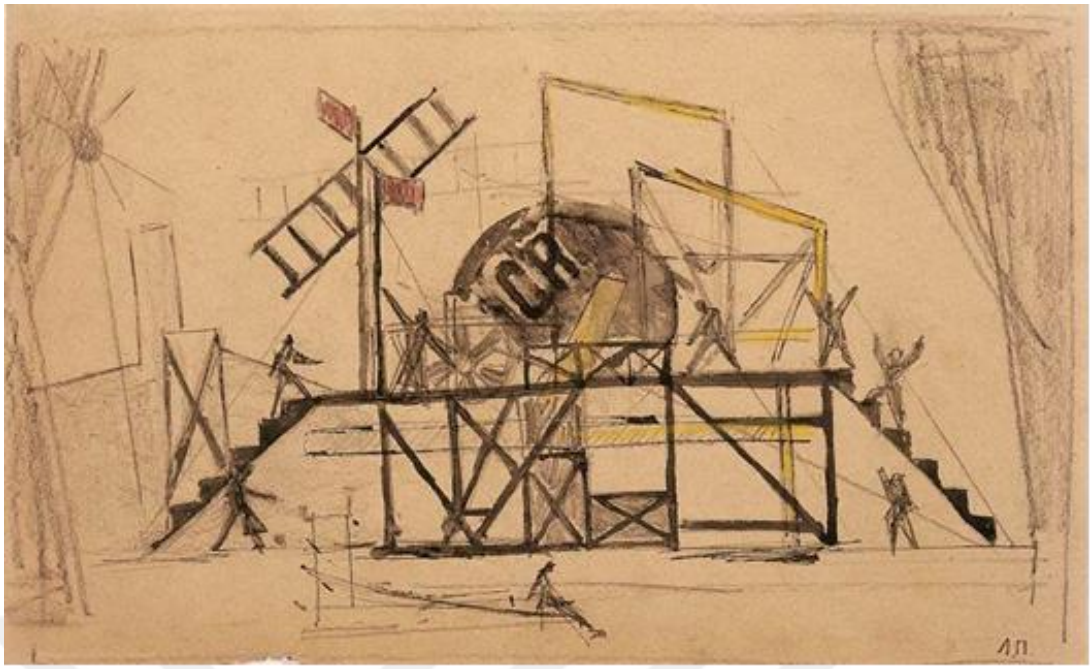

Figure 11. Preliminary Design for the Magnanimous Cuckold, Artist: Liubov Popova, Russian, 1889-1924, ca. 1920-ca. 1922 (Source: McNay Art Museum, n.d.).

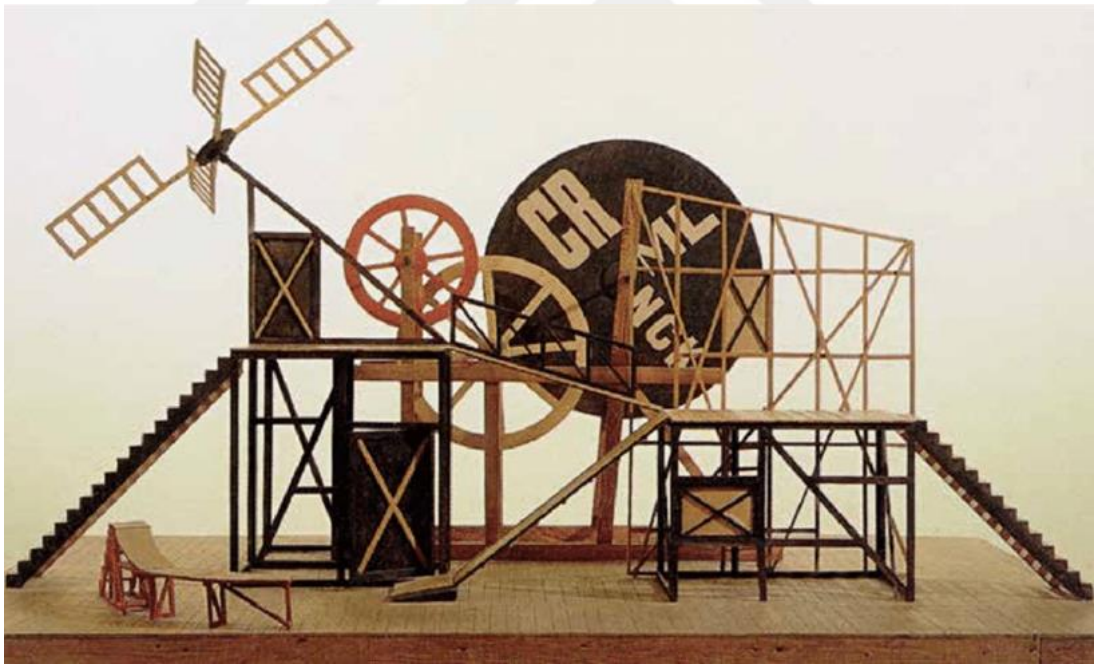

Figure 12. Lyubov Popova's Fantastic Mechanical Set for the Magnanimous Cuckold, 1922. Photograph: V&A (Source: The Guardian, 2014).

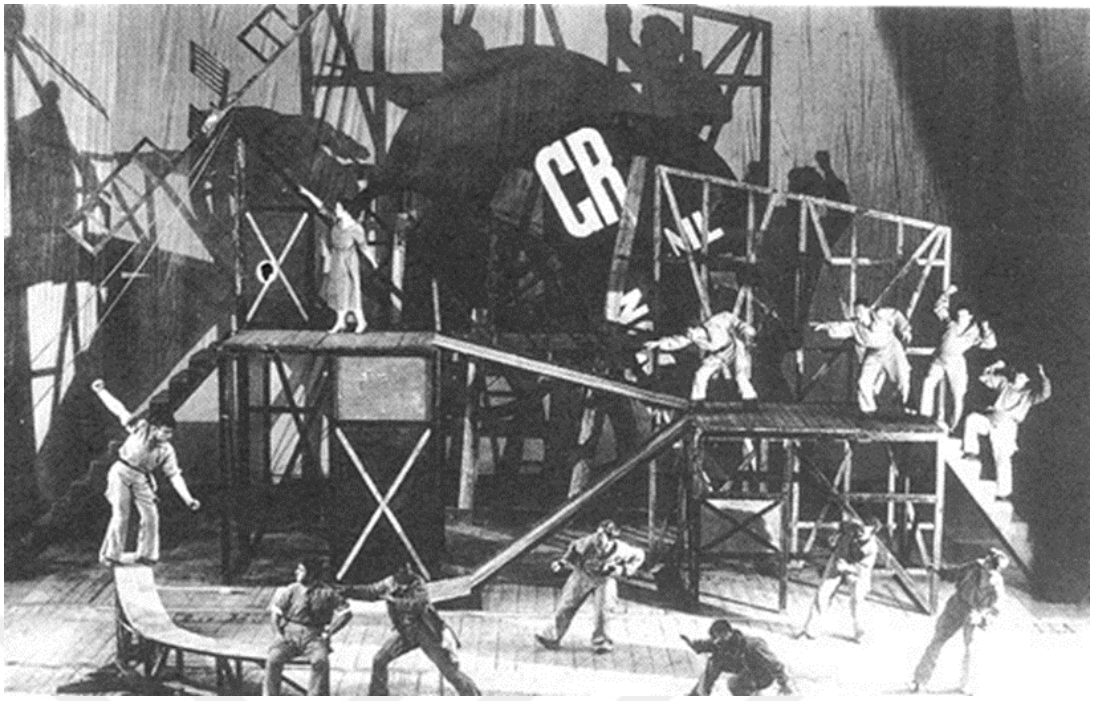

Figure 13. The Magnanimous Cuckold Production by Vsevolod Meyerhold, Scenic Design by Lybov Popova, 1922 (Source: Skopbülten, 2016).

The performance was based on the beams and cross-beams of the stage, and performers could perform with the help of the dynamic of the stage space. The architectural lines and performers worked in harmony. In this performance, action and construction, which are Scenography and Performance, could not be separated. The developments of scenic design varied from novel ideas like Terence Gray's Festival Theatre in Cambridge to Tyrone Guthrie's invention of the thrust theatre. The Olivier Theatre, built by Dennis Lasdun for the Royal National Theatre in London, and Mariano Fortuny's lighting experiments also contributed to the expansion of performance spaces. Additionally, George Izenour's famous publications on Theatre Design and Theatre Technology had a significant impact on how people saw and utilized scenic design. Together, these developments and investigations pushed the limits of what a performance space could be, creating fresh opportunities for invention and creativity in the scenic design industry (Oddey, White, 2006).

3.2. Scenic Design Examples

Scenic design examples can be examined under different types of live performing arts, such as theatres, musicals, concerts, and fashion shows; the recorded ones that can be named as audiovisual productions, such as movies, series, commercials, and more.

> *"The idea of "sustainability" for theatres is not necessarily new, but the awareness and visibility of the concept have accelerated in recent years. More theaters in 2021/22 are putting sustainability statements in place aiming for new measures and goals to help combat climate change."* (Guay, 2022).

The following part includes examples of sustainable scenic design.

3.2.1. Scenic Design Around the World

The first designer is Tom Piper, who is an award-winning scenic designer. Piper always considers reuse and recycling in his designs, however, he states that because he is a freelancer, it is hard to know what the organization has in its stock.

The Templest is one of his designs in which he implemented sustainability through the scenic design process (See Figure 14).

Figure 14. The Set of the Tempest with the Large Mirror from the Kiln Theatre (Source: RSC, n.d.).

One of his other designs for “Girl on an Altar” by Kiln Theatre (See Figure 15) has wooden plank flats that have texture given by burning to match them with the auditorium of Kiln, and the woods were already repurposed for the show. Because it was planned before, the wood went to the storage facility after the show finished to be reused.

Figure 15. Girl on an Altar Designed by Tom Piper, 2022 (Source: Youtube, 2022).

Piper states that if the network between productions is provided, it makes all creative teams aware of what is available and can be used for a particular performance. Piper also mentions that storage is the biggest problem. Because the cost of commercial storage is expensive, it is cheaper to build a new prop instead of storing the existing ones (RSC, n.d.).

Another example is Mr. Burns, which is a post-electric play with zero waste (See Figure 16). The director, Khristián Méndez Aguirre, and the scenic designer of the play, Iman Corbani, aimed to do something new, which is a zero-waste production. Corbani states that they used hand tools instead of machines. They also used rocks instead of theatre weights and put them back in nature after they were finished using them (Stallings, 2018).

Figure 16. Mr. Burns a Post-Electric Play with Zero Waste (Source: Iman Corbani, n.d.).

The waste product was 5.2% of the net scenic weight when the set had been deconstructed and the weight of everything in the trash bin was calculated, showing that 94.8% of the props were preserved and kept out of landfills. An additional analysis of the 94.8% of scenic weight and materials revealed that 86.5% were given to other businesses for reuse, 7.6% were recycled, 0.5% were returned to the places of purchase or loan, and 0.07% were composted (Corbani, n.d.).

The theatre play Helicopter, was selected to study the ecological design of performing arts (See Figure 17). This study had three aims: To determine the challenges in the process of implementing eco-creativity to performing arts, the effects of ecological parameters on the scenic design process, and to enlighten future ecoscenography studies.

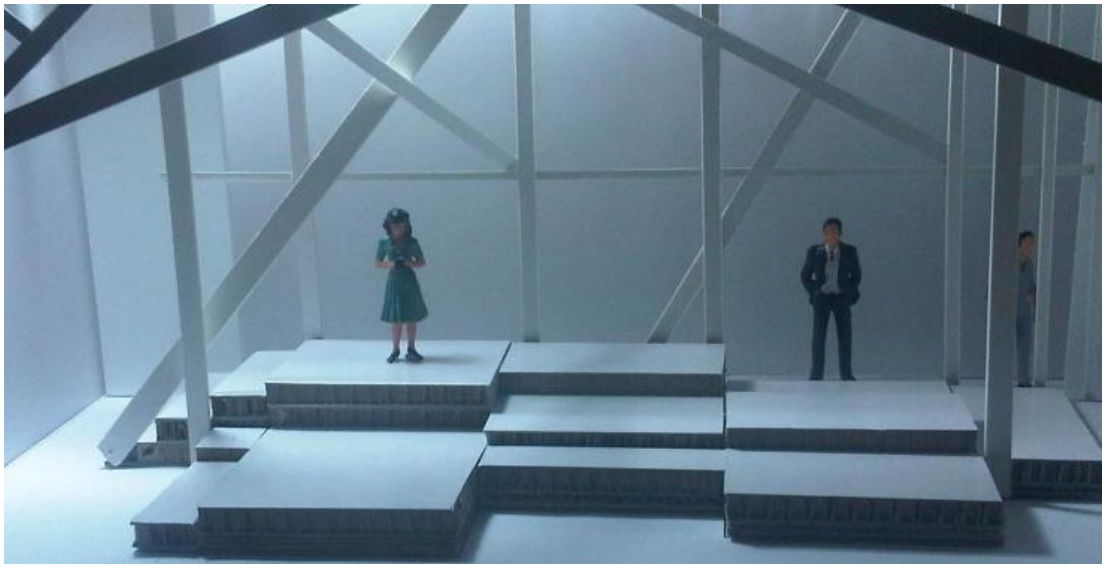

Figure 17. Original Helicopter Model Depicting a White Cyclorama Background and Thicker Pillars of Cladded Steel, Photo by T. Beer (Source: Beer and Hes, 2017, p. 45).

Guay (2021) states that they considered the possibility of a futuristic, green planet with fake trees that would transform into an environment when the giants crushed across the narrative. So, partly inspired by design and partly by chance, their department experimented with using an unusual material, which is trays. They discovered that trays had great patterns, were all the same color, were fairly sturdy; and could also be cut with scissors (See Figure 18).

Figure 18. Into the Woods (Source: Erika Guay, 2021).

3.2.2. Scenic Design in Turkey

Even though props and other stage materials are highly stored and reused, the awareness of sustainable design in Turkey is still improving, as it mostly does not happen under the name of sustainability. There is an important lack of research in this field. It is rare to find a scenic design where sustainability is implemented consciously. However, most of the scenic designers actually consider reducing energy, reusing the props, and recycling the materials, and all of the materials are highly stored.

The "Zero Waste and Recycling" courses organized by Fethiye Public Education Center aim to raise awareness among children about sustainability through "Applied Theatre" and "Handicrafts" workshops, where they produce decorative materials from newspapers (Fethiye TV, 2023) (See Figure 19).

Figure 19. The Zero Waste and Recycling Courses Organized by Fethiye Public Education Center (Source: Fethiye Tv, 2023).

The scenic designer, Kavurt, mentioned that recyclable materials are used for the overall scenic design of the play, and second-hand materials get bought and modified according to the needs of the design (See Figure 20).

Figure 20. Bütün Kadınların Kafası Karışıktır, Scenic Design by Serkan Kavurt (Source: Ulu, 2022).

In Edirne, theatre artists created a theatre stage from waste materials with the slogan "from trash to stage." The theatre group of Keşan Municipality Art Center processed and utilized unusable items such as tables, chairs, carpets, curtains, coffee tables, and textile products to create the theatre set. The play titled "Ocak," written by Turgut Özakman, directed by Onur Öztoprak, and with Kadir Kılıç as the general artistic director, met theatre enthusiasts at the Selim Sesler Conference Hall. Numerous materials, including the set and props, were not discarded but rather recycled and repurposed to contribute to the stage production, becoming an integral part of this remarkable play (AA, 2023) (See Figure 21).

Figure 21. The Play Titled "Ocak," Written by Turgut Özakman, Directed by Onur Öztoprak, and with Kadir Kılıç as the General Artistic Director (Source: Edirne Haber, 2023).

Children who bring recyclable waste to Gürsu Municipality in Bursa have the opportunity to earn tickets and are invited to weekly theatre or cinema events. Within the scope of this initiative aiming to raise awareness about waste collection, children who bring recyclable materials such as glass and plastic bottles, paper, and batteries to the Climate Change and Zero Waste Department of Gürsu Municipality are rewarded with cinema and theatre tickets. The goal is to foster a consciousness among not only children but also the wider community, highlighting the importance of preserving nature through the zero waste system achieved by recycling waste (Anayurt Gazetesi, 2022) (See Figure 22).

Figure 22. Children Who Bring Recyclable Waste to Gürsu Municipality in Bursa Getting the Opportunity to Earn Tickets and Are Invited to Weekly Theatre or Cinema Events (Source: Anayurt Gazetesi, 2022).

3.3. Method

The study aims to discover the challenges regarding the sustainable use of scenic design materials, mostly focusing on props. In order to discover, a method is selected to discuss with professionals from different scenic design fields.

The first step is to contact one of the municipal theatres to figure out how the scenic design process works, who the responsible actors are, and what the challenges are in public enterprises.

The situation in municipal theatres led the study to private theatres. One of the most active organizations, Hasan Özkaya Organization, is selected. The interview is done with the owner, Hasan Özkaya, and his permission to watch the plays and the installation process of their scenic design is given.

The next step is to contact a digital designer in order to discover the use of digital art

and how it might help the sustainability application on scenic design.

The final aim is to do a survey to scenic designers in order to determine how aware they are of sustainability and how they apply it to their work.

CHAPTER 4: METHOD

4.1. Selection of Method

One of the applied research methods, online survey application, has been selected as the method for this study out of other research methods. According to Schwarz and Sudman (1996), the quality of a survey depends on the answers the survey respondents provide. Hence, it was aimed to reach the scenic designers from different places in Turkey instead of approaching just one city or region. An online survey was selected for this study; thus, it would be easier to reach the needed number of participants from different places in Turkey in a short time. Questions were created in order to answer the research questions of the study. Therefore, the research questions were examined under topics, and several questions were selected for each topic. The survey is supported by meetings and interviews with professionals to get more detailed information.

4.1.1. Instruments

As a first step, the meetings with municipal and private theatres were arranged with the intent of getting general information about the production team, the scenic design process, and the challenges they face during this process. Interviews with one selected digital artist and scenic designers followed the meetings. It was aimed at getting more detailed information from professionals who work actively in the field. In light of the data collected so far from the meetings and interviews, the survey questions were created to answer the research questions of the study.

4.1.1.1. Meetings

Meetings were the first step of the study, so that the raw data collected from previous studies and literature determined the questions for the meetings. The main purpose was to investigate the financial and general support for the municipal theatres. Additionally, it was aimed to ask the challenges and their solutions if any exists. Meetings with the provincial director of culture and tourism and the head of the city theatres were arranged. The related municipality chose not to disclose its name due to privacy issues.

4.1.1.2. Interviews

The research questions of the study aim to find out the challenges regarding the use of props in sustainable scenic design and possible solutions to the challenges with the help of the understanding of Shedroff (2009), which is that sustainability can be examined under five main topics, which are reduce, reuse, recycle, restore, and process; digital technology use and alternative design strategies.

The first interviever was a digital artist, Can Büyükberber, who has spectacular works (See Figures 23 and 24). The aim of the questions was to acknowledge the artist and his works, his approach to digital technology use in art and scenic design; his understanding of sustainability, and the use of digital technology in sustainable design (See Appendix A).

The idea of modular design in sustainable design was inspired by the scenic design of the theatre play "Evlat". The second interview was arranged with the scenic designer of this play, Sıla Karakaya, who actively takes part in important projects in Turkey. The questions were created in order to find out the challenges of the scenic design process, the solutions if any exist, the sustainable design approach of Karakaya, and her opinion on modular design.

4.1.1.1. Survey

The survey questions are prepared in order to support the research questions of the thesis. It has nine multiple-choice questions, one with check boxes, and ten open-ended questions, for a total of twenty questions. The first question aims to find out their approach to sustainability and sustainable scenic design. The purpose of the question two through eight is to discover how aware they are of sustainable design and to what extent they implement sustainability in their design process. The following questions are aimed at getting detailed answers for sustainable design challenges and solutions (See Appendix B).

4.1.2. Selection of Participants

To get the formal information, one of the local municipal theatre was selected. Meetings with the provincial director of culture and tourism and the head of the city theatres were arranged. To compare the situation in municipal theatres, it was decided

to arrange another meeting with the private theatres. Hasan Özkaya Organization, which has several ongoing theatre plays designed by some of the most active scenic designers, was selected for another meeting. A phone call was also arranged with one of those scenic designers, Serkan Kavurt to discuss his scenic design for “Tatavlada Son Dans” which will be examined in the following parts (See Figures 28, 29, 30, 31,32 and 33).

Through research, digital technology and modular design have emerged as proposed solutions to address the challenges faced. The continuously evolving field of digital art has been compelled to advance further during the pandemic, as live audiences were unable to attend performance arts, leading to an increased reliance on digital technology in this domain. Can Büyükberber was selected to examine the use of digital technology in sustainable scenic design. He was selected for this part because he is highly experienced in both Turkey and internationally.

The use of modular design in the stage production of the play "Evlat" has been proposed as a solution in design challenges, prompting an interview with Sila Karakaya, the stage designer of the play, to explore this idea further. Sıla Karakaya was selected for the interview with the scenic designer part of this study because of her active work in scenic design in many various fields, such as theatre, commercial, and more.

4.2. Application Process

The following part explains the application process of each instrument to professsionals in detail.

4.2.1. Municipal Theatres

The research on scenic design in Turkey for this thesis began by searching for theatre plays and competent bodies. The first aim was to contact the municipal theatres to explore how the scenic design process is handled and who the authorities are in this process. After finding out the relevant authority, several calls were made, and a meeting with the provincial director of culture and tourism was arranged. The main purpose of this meeting was to ask about the city theatres, their scenic design process, and the designated team for this process, and if there are any budget problems affecting

the process.

4.2.2. Private Theatre Organizations, Hasan Özkaya Organization

The status of municipal theatre directed the study to private theatre organizations. Hasan Özkaya Organization is chosen for the study. After contact with the owner of the organization, permission was given to witness the process of installation of two plays, Muhteşem Ikili (directed by Atilla Şendil), and Tatavlada Son Dans (directed by Berfin Zenderlioğlu). Hasan Özkaya, the owner of the organization, discussed the process for private theatres and stated several problems.

The main mission of the organization is to provide a team for a play. A person, which can be a director, a playwright, or an actor that will also support the play financially, comes with the idea of a play. Some of the team members can be provided by them, or they can ask for each member they need for the play. After the arrangement is made, the process begins.

4.2.3. Interview with Digital Artist, Can Büyükberber

According to the previous research, in order to discover what the possible solutions for the challenges of scenic design process are and how to apply sustainability to avoid material waste and high costs, the use of digital art was suggested.

The outcome to be gained from this interview is to figure out what digital art is and how it can be used for scenic design. The aim of the interview questions is to learn who a digital artist is, what their job is, what they get inspired by, how digital art projects work, how the design process works, what the challenges are during this process, if budget and material waste are one of those challenges, how to deal with them, the possibility of sustainability being used in these projects, how to apply sustainability to scenic design in order to use digital art, and if there are any other suggestions for the challenges.

Can Büyükberber has been chosen for this interview. Can Büyükberber (b. İzmir, 1987) is a visual artist who works on visual-auditory experiences that blur the boundaries between the physical and digital realms. His works consist of virtual/augmented reality, projection mapping, geodesic domes, large-scale screens,

and digital production experiments (See Figures 23 and 24). Guided by interdisciplinary thinking that spans art, design, and science, his works focus on human perception, and explore new methods for nonlinear narratives and emergent forms.

Büyükberber received his Master's degree in Art and Technology from the San Francisco Art Institute as a Fulbright Scholar and has been selected for the Autodesk Pier 9 and Adobe's AR Artist programs. His works have been exhibited in museums, galleries, and media art festivals around the world, including ZKM (Karlsruhe), Ars Electronica (Linz), SAT (Montreal), Sonar D+ (Barcelona), Dolby Gallery, California Academy of Sciences, Exploratorium (San Francisco), Signal Festival (Prague), Akbank Sanat (Istanbul), Art Futura (Rome), BFI Film Festival (London), MUTEK.JP (Tokyo), and ZeroSpace (New York), among others.

Figure 23. Metafold Collection, Tersane İstanbul (Source: Can Büyükberber Archive, 2023).

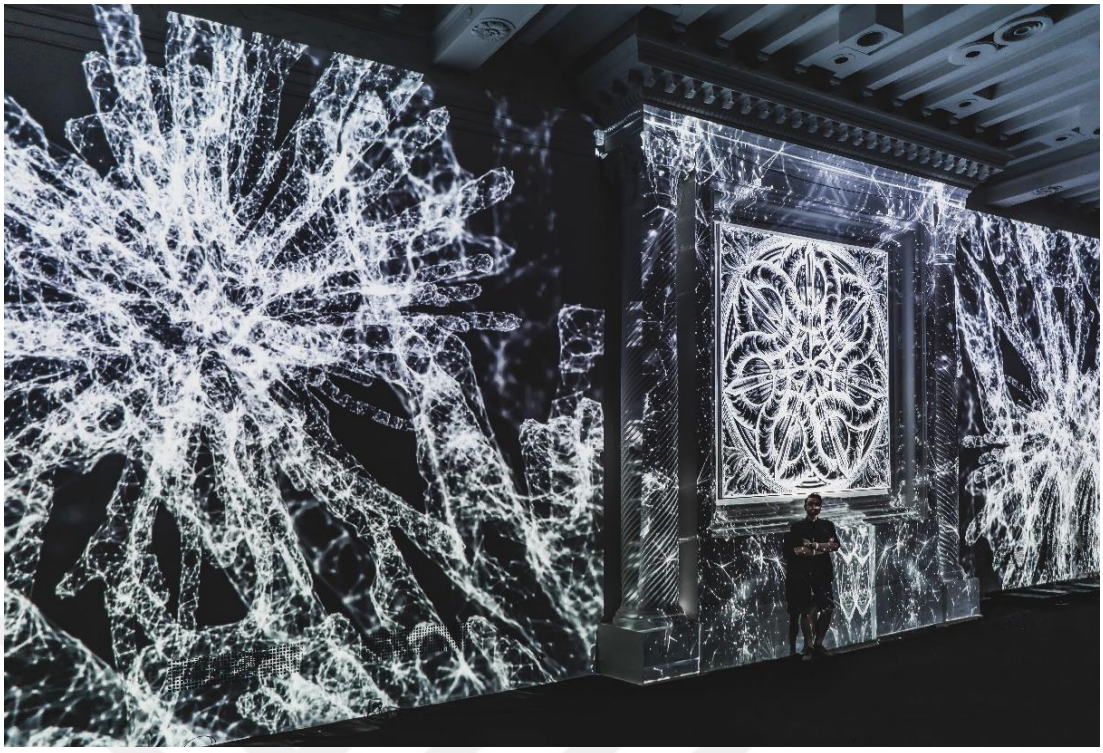

Figure 24. Noumenon, ZeroSpace, NYC (Source: Can Büyükberber Archive, 2023).

4.2.4. Interview with Scenic Designer, Sıla Karakaya

The interview with scenic designer is aimed at getting detailed information about the scenic design process from a professional who is actively taking roles in projects both in Turkey and internationally. The main purpose of the interview was to talk about the challenges in the scenic design process, what the solutions are, and what the alternative solutions can be. The scenic designer was also asked about modular design and the use of digital technology in scenic design. The outcomes will be revealed in the following parts:

Sıla Karakaya is a production designer and art director who graduated from New York University, NYU TISCH School of the Arts with an MFA degree in production design and scenic design. She has a background in MFA, which is lighting design, and BFA, which is interior architecture. This was another reason for her to be selected for this study. Her highlight projects are Nomen for Disney+, Boy From Heaven, awarded best screenplay at the 75th Cannes Film Festival, and shortlisted for the 95th Academy Awards: When I'm Done Dying (Bir Nefes Daha) as the 54th Siyad Awards Nominee, Baskın as the 49th Siyad Awards nominee, and Redhook Summer (Karakaya, n.d.).

4.2.5. Survey to the Scenic Designers

Firstly, for the participant selection of the survey, ongoing theatre plays were detected. It paid attention to the design style of the plays, what type of props were used, and which plays were suitable to implement sustainability. After the research, several scenic designers were selected. After several attempts to contact them, it was possible to contact around ten designers. The rest of the participants were found and selected with the help of suggestions from people who have jobs related to performing arts, municipal theatres, private theatres, and theatre clubs at universities.

4.3. Findings and Solutions

This part includes the findings from the meetings, interviews, and online surveys. According to the findings, solutions are suggested.

4.3.1. Municipal Theatres

After the meeting, I was informed that it is a hard process to get permission to get budget information. It is stated that there is a **lack of financial support** for the city theatres and because of budget problems, plays with a minimum royalty rate have to be chosen, or they write their own plays that will cost the minimum. Usually, at least two plays are arranged per year, and each member of the team deals with each issue during the process. The municipal theatre of the city that is chosen for this study commonly chooses theatre plays for children since its scenic **design process is the easiest and the cost is the lowest**.

It is also discussed that there is not **a professional design team,** as discussed in previous chapters. After the play is chosen by the head, with the help of a craftsman and other team members, the scenic design gets completed.

Previous props are mostly stored backstage or in the prop rooms downstairs. There is a workshop area downstairs from the stage and several rooms for props and costumes. There **is not enough space for all of the properties**; therefore, even the backstage is used as storage.

The main issues arising from the discussion with the municipal theatre include insufficient financial support, leading to the selection of plays with the easiest and least

costly design processes, a lack of a qualified and professional design team, and inadequate storage spaces for props.

4.3.2. Private Theatres

Hasan Özkaya mentioned some of the problems, such as **budget limitations, lack of materials and equipment in theatres, transportation,** and more. Due to the lack of financial support, the organization has a limited budget for each theatre play. It is arranged to use a **minimum of vehicles** for transportation; in fact, sometimes even the actors use the same vehicle with the scenic design equipment. The technician also mentioned that the lighting designer has to consider each situation and design lighting according to it because the **lighting equipment** may not be enough.

The following parts will examine two theatre plays that have different scenic design ideas.

The first example of a theatre play in Turkey that is examined in this article is "Muhteşem İkili". The main material that is used in this play is theatre flats. Each **flat has a different size, a different design, and different openings.** Even though the main idea behind each flat is the same as a framed wooden flat, each piece has a unique design and gathers to create the whole background of the scenic design (See Figures 25, 26, and 27).

Figure 25. Stage Installation of the Theatre Play “Muhteşem İkili”, 2023.

Each piece has to be attached perfectly to **avoid any accidents.** Flats have openings for windows and doors, which will be attached during the installation on the stage.

Figure 26. Installation of The Door into a Theatre Flat, 2023.

Figure 27. Installation of the Columns onto the Theatre Flats, 2023.

The process of the installation begins as the props and design elements are brought by the vehicle. The technicians carry the equipment to the stage and start installing it. Firstly, **they measure the stage and adapt the design according to the measurement**. For this play, the background design was made of theatre flats, which are framed panels that have decorations on them. Their sizes are different, and there are openings for windows and doors. After the installation of the flats is done, they add the doors and columns.

The reuse of the scenic background of the play "Muhteşem İkili" is possible since the materials are theatre flats, which are basically wooden frames with coverings. If the coverings are removed, it is possible to reuse the wooden frames for future plays.

Tatavlada Son Dans is another play that is examined in this article. This play has a political topic, and the design concept is a collapsed construction. The background of the stage was made of pieces that have **a more complex design** than traditional theatre flats. They have the same purpose, yet the joints are more complex. (See Figures 28, 29, 30, 31, 32, and 33.)

Figure 28. The Back View of the Scenic Background of the Theatre Play Tatavlada Son Dans, 2023.

Figure 29. The Detailed Back View of the Scenic Background Frame of the Theatre Play Tatavlada Son Dans, 2023.

Figure 30. Detailed Front View of the Scenic Background Structure, 2023.

The structure has a stone texture to represent the era when people were killed or the buildings were damaged and forced to migrate. The damaged texture is supported by lighting to create the feeling. The designer, Kavurt, stated that this structure has a detailed calculation to keep it **balanced**. He also mentioned that it is hard to reuse this design considering the removal process for the elements. It has to be done wisely to

use some of the elements for recycling.

Figure 31. The Back View of the Scenic Background of the Theatre Play Tatavlada Son Dans, 2023.

Figure 32. The View of the Overall Design, 2023.

The illuminated structure behind the main design represents undamaged buildings. The designer mentioned that even though it is hard to reuse the styrofoam structure, the metal frames in the background can be used for similar purposes. The lighting also supports the design.

Figure 33. Final View of the Theatre Play Tatavlada Son Dans, 2023.

The owner of the organization, Hasan Özkaya, faces several challenges, including a lack of financial support, insufficient materials and equipment in the theatre halls, and the need to minimize the use of vehicles due to transportation costs.

Theatre flats used in the design of the play "Muhteşem İkili" had different sizes, designs, and openings in various locations. However, they were constructed with wooden frames that are suitable for reuse based on a grid design. The assembly and connections of the theatre flats were carefully executed to ensure the safety of the actors. To fit the entire design on stage, the stage was initially measured, and the theatre flats were positioned accordingly.

The background design used in the play "Tatavlada Son Dans" was more unique compared to "Muhteşem İkili," making it less suitable for reuse. The designer emphasized that the structure was created with special calculations to ensure its balance, thus preventing any stage accidents. Additionally, the design was enhanced through the use of lighting.

4.3.3. Interview with Digital Artist, Can Büyükberber

The interview questions were sent via e-mail. Can Büyükberber answered the questions in writing. His answers are given below.

Question 1. Please give a brief description of your art and projects.

Büyükberber: *"I am a visual artist. My main practice is to conceptualize multisensory experiences fed by visual imagination, scientific theories, art, philosophy, and technology. In these processes, I interpret emerging forms and concepts using various technological tools, conducting research and experiments on innovative aesthetics in physical and digital spaces. As an artist focusing on the relationship between the physical and digital realms, I explore new aesthetic appearances by employing technologies and techniques that enhance this connection. One of the fundamental aspects of my work is the transformation of the forms and experiences I create into different emotions through different media, resulting in variable spatial effects across various scales and screens. This constant experimentation leads to an ongoing cycle of experimental production. Everything waiting to be discovered beyond the horizons of human consciousness and our collective knowledge is inspiring to me."*

Question 2. What were the reasons for you to start digital art? Have you worked in any other field?

Büyükberber: *"From an early age, I had an interest in both science and art. During high school, my curiosity in these fields led me to develop my skills in computer-generated imagery (CGI), which can be described as the intersection of both disciplines. I dedicated myself to self-education, producing amateur projects, and participating in initiatives that would facilitate my entry into the professional sphere. In my third year of undergraduate studies in physics, I decided to leave and was fortunate to be awarded a 100% scholarship for the Visual Communication department at Bilgi University. The rich cultural atmosphere at Bilgi University triggered my development in design and aesthetics and introduced me to the realm of media arts. After graduation, I desired to further cultivate my ideas in this field and sought to enroll in a graduate program with an artistic focus. In 2015, as a Fulbright scholar, I*

embarked on the Art and Technology program at the San Francisco Art Institute, which shaped my current body of work. Subsequently, I engaged in various artist programs and studio experiences in the United States, refining and evolving my artistic practice."

Question 3. Please give some examples of your art projects.

Büyükberber: *"One of the prominent elements in my work is the exploration of methods that enhance immersion, which refers to the feeling of being fully enveloped and transported to another place. This can take the form of a completely digitally constructed visual-auditory experience using virtual reality headsets or utilizing various visual technologies within the confines of an architectural structure. In designing these experiments and experiences, I seek to find innovative ways, aided by cutting-edge technologies, to facilitate the transfer between the physical and digital realms. By creating speculative and hybrid realities, I aim to generate rich sensory experiences that have not been previously encountered. Some of the methods I employ include augmented reality, 3D printers, laser cutters, architectural projection mapping, and various printing techniques."*

Question 4. What is your source of inspiration and motivation before you start work?

Büyükberber: *"I view my artistic practice as the result of an active outcome of imagination. Rather than prioritizing images that are readily capturable or generatable by existing technological devices, I attribute the value to visualizations that originate exclusively within the human mind. Thus, what motivates and stimulates my creative process often derives from the visual content of my dreams, spontaneous visions that manifest within my consciousness, or inspiration derived from scientific theories."*

Question 5. How does the design process start?

Büyükberber: *"Initially, I focus on form, akin to a traditional sculptor. In this process, a tablet and stylus can prove beneficial for sketching purposes. Subsequently, the translation of form into the three-dimensional realm, its animation, material selection, calculations of lighting, and preparation for an*

exhibition in the chosen area becomes necessary. To prevent the confinement of the process within the screen and enable multidimensional thinking, incorporating 3D prints, high-resolution 2D test prints, projection tests for larger-scale viewing within the physical space, and occasional utilization of virtual or augmented reality environments prove highly advantageous. These methods facilitate the examination of the artwork from various perspectives."

Question 6. How do you manage the design process schedule and deadlines? What are the difficulties you have to deal with during this process, and how do you deal with them?

Büyükberber: *"If the project involves an exhibition or performance, the dates are usually determined by the venues, galleries, or festivals, and the preparation process is shaped accordingly. On the other hand, if the project entails a collaboration with a brand and requires a custom design process, the duration of the work is scheduled based on the intensity of tasks such as rendering the computer-generated experience, sound design, and other processes. As a creative practitioner with over 10 years of experience in the digital arts, I have established a specific aesthetic and artistic approach. This enables me to* ***feel a sense of freedom*** *during the production process, and* ***the timelines, budgets, and other factors*** *are typically determined through mutual understanding, transparency, and consensus with curators or brands who hold respect for art and artists. For instance, if the budget of a project is not sufficient to allocate time for the creation of an original design, an alternative approach such as licensing an existing artwork may be considered. This process reduces my involvement, shortens the timeline, and can be more cost-effective."*

Question 7. What is your opinion on sustainability, and do you use it in your projects?

Büyükberber: *"Individuals who engage in art with technology should not only act for their personal interests but also for* ***the collective good.*** *The artist acknowledges the importance of sustainability as a significant element in their work and provides us with the inspiring example of American architect and systems theorist Buckminster Fuller. Drawing from Fuller's comprehensive thinking system and his perception of the world as a spaceship, the artist shares*

*Fuller's belief that every individual has a synergistic responsibility to **think holistically.** From this perspective, artists working with technology should take action not only for their own interests but for the benefit of the whole. The artist suggests that it is worth considering how these resources can be utilized, how technology can be developed, and how applying design from a scientific perspective reveals that existing resources and human potential are indeed sufficient to solve all problems. The only barrier, according to the artist, lies in greed or individuals prioritizing their personal interests."*

Question 8. What do you think about the use of digital technology in scenic design for the performing arts?

Büyükberber: *"Digital technologies enable innovative and interactive presentation formats that deeply engage audiences in the context of performing arts and live performances. I find the technologically supported stage performances by Japanese media artist Daito Manabe particularly fascinating in this regard. On another note, immersive technologies in set design offer **remarkable flexibility and applicability** to narrative storytelling. Through the technology called StageCraft, developed by Lucasfilm, **large-scale LED screens** supported by real-time graphics allow actors to instantly immerse themselves in environments such as a desert or an icy planet. Beyond the limitations of traditional green screen effects, **realistic camera movements, reflections on actors, and real-time lighting** create more realistic and expedient cinematic results."*

Question 9. Do you think digital technology in art contributes to sustainability?

Büyükberber: *"Certainly, digital technologies not only accelerate **communication speed** but also significantly **reduce logistical obstacles and energy inefficiencies** associated with **the transportation of physical materials** from one place to another. The education system that emerged after the Industrial Revolution, which emphasized skilled labor, production-oriented approaches, and specialization, is no longer valid in the complexity of contemporary life and the pursuit of rich life experiences and creative output. Merely having multidisciplinary skills in design and art techniques is no longer sufficient; there is an increasing need to acquire knowledge and stay updated in*

various fields such as engineering, architecture, entrepreneurship, personal branding, and management. The reward for this is the ability of corporate bureaucracies to streamline and reach audiences directly without intermediaries. From this perspective, digital art and technology serve as liberating disciplines and tools. As a practitioner, I have been able to showcase my work simultaneously in different parts of the world through remote work for some time now. Post-pandemic, the cultural atmosphere has become even more conducive to the widespread adoption of this business model. This situation has also positively impacted digital art and digital economies."

A digital artist employs technological tools to create innovative designs in both physical and digital environments. They transform the forms and experiences into different emotions through different media tools at different scales and screens. Digital technology allows artists to express their imaginations without physical or material barriers.

According to Büyükberber, in a design process, dates are determined by the places where the art will be held, such as venues, galleries, and more. The preparation process is also considered. If the artwork is custom designed, it requires design, rendering, and sound design time. In addition, the experience of an artist determines the sense of freedom of client. **Mutual understanding**, transparency, and consensus with curators or brands are also important factors in the communication between the artist and the client. If there is a **budget limitation** for a new design, licensing an existing work shortens the timeline and costs less.

Digital artists should work for the collective good instead of focusing on their own interests. Büyükberber mentions that the architect and engineer Buckminster Fuller believes that every individual has a synergistic responsibility to think holistically.

Through the technology called StageCraft, developed by Lucasfilm, the large-scale LED screens allow artists to create backgrounds with various environments, such as deserts or poles. Thus, once the **LED screens** are provided, it requires **less material** than a scenic design created with physical props and costs less in the long term. It also provides realistic camera movements, various reflections on actors, and real-time

lighting opportunities.

Digital technology also provides communication speed. It significantly reduces logistical challenges and energy inefficiencies associated with the transportation of physical materials from one place to another.

4.3.4. Interview with Scenic Designer, Sıla Karakaya

The interview was held on Zoom, and it was in discussion form. Firstly, the modular design of the "Evlat" theatre play was discussed.

> **Karakaya:** *"The intention of the scenic design for Evlat was not to create a modular design. It was more complicated than it seemed, so it did not have any units that could create a modular design."*

The design concept was determined by the needs of the producer. According to Karakaya, it is not ethical to use one of the designs of a designer by other designers; therefore, it is not possible to create a **modular design** that will be utilized in different designs. However, an efficient modular design could help sustainability if it is designed wisely.

> **Karakaya:** *"In terms of digital technology used in scenic design, it is not beneficial to use LED screens in **theatre tours** because it will cost a lot to rent LED screens for a long period of time, so theatre flats are preferred. However, it is more beneficial to use them in one-off projects such as movies and commercials. If the producer decides to invest money in LED screens, it is also possible to use them on tours. One example of this is "The Alice Musical", as the producer bought the LED screens for the musical."*

Although LED screens provide dynamic visual possibilities, because of the high cost of long-term renting, their use during theatrical tours may not be economically advantageous. However, using LED panels for one-off projects like movies and commercials seems to be more advantageous.

> **Karakaya:** *"Meanwhile, in other countries, there are storage places for theatre*

flats; there are none in Turkey. Hence, after shows are finished, the theatre flats mostly become useless, and each production has to build its own theatre flats for each play."

The highlight of the discussion was the storage of the **theatre flats**. She suggested that a **storage system** for theatre flats could be efficient for sustainable design and reuse.

The challenges that emerged from the interview with Sıla Karakaya revolved around transportation and storage. According to Hasan Özkaya, the owner of the organization, the props are specifically designed to be transportable by compact and minimal vehicles. Karakaya also mentioned that they try to avoid using ten-wheeled trucks because their movement is limited in traffic. Sıla Karakaya mentioned the need to minimize the number of vehicles used and suggested using small trucks for easier traffic navigation due to transportation costs. She emphasized the necessity of organizing a storage plan for props that have completed their use. The issue of continuous production and disposal of theatre flats due to storage limitations was addressed as one of the primary concerns regarding stage materials. Sıla Karakaya pointed out the existence of storage spaces for theatre flats abroad and suggested taking inspiration from them. She mentioned that modular design could contribute to sustainability but highlighted that it would not be ethically feasible for multiple designers to use the same modular design. Additionally, she stated that while LED screens could be useful for single-shot projects such as film advertisements, renting them for theatre productions that involve touring and extended durations would not be financially efficient.

4.3.5. Survey Results

1) What are your thoughts on sustainability, and sustainability/recycling in scenic design?

This question was asked to examine the thoughts of scenic designers on sustainability and sustainable design.

The options were scaled from "highly negative" to "very positive". 48% of the participants (12 out of 25) chose positive; meanwhile, 36% (9 out of 25) chose highly

positive, and 16% (4 out of 25) chose neutral (See Figure 40).

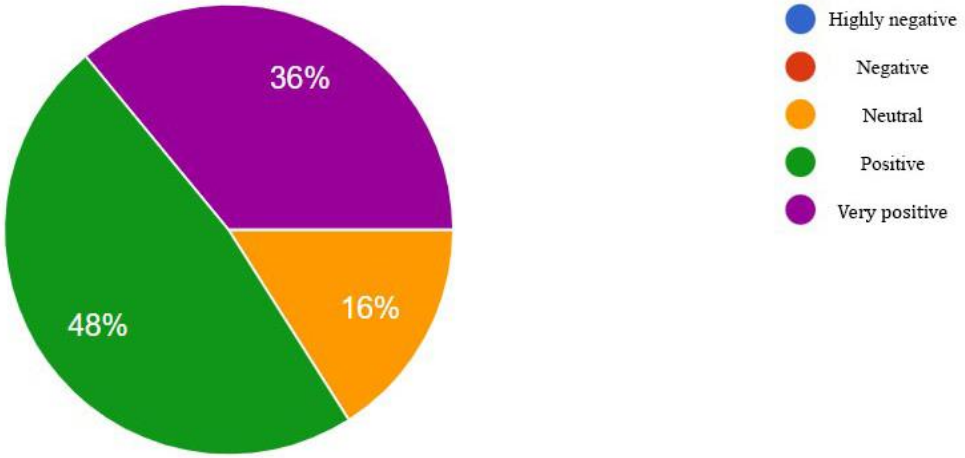

Figure 34. Pie Chart of Results for Question 1.

The result shows that the sustainable design approach of the selected scenic designers is generally positive. The fact that 36% of the participants chose the highly positive option while 48% selected the positive option may indicate that designers still have some doubts or are not fully conscious of sustainability and sustainable design. The 16% who chose the neutral option might be uncertain about the topic. However, no one has a negative approach towards sustainability.

2) In the process of stage design, how conscious are you about sustainability and recycling?

This question was asked to examine the awareness of scenic designers about sustainability and recycling.

The options were scaled from 1 to 5. 36% of participants (9 out of 25) chose 4, 24% (6 out of 25 for each option) chose 3 and 5, and 8% (2 out of 25 for each option) chose 1 and 2 (See Figure 41).

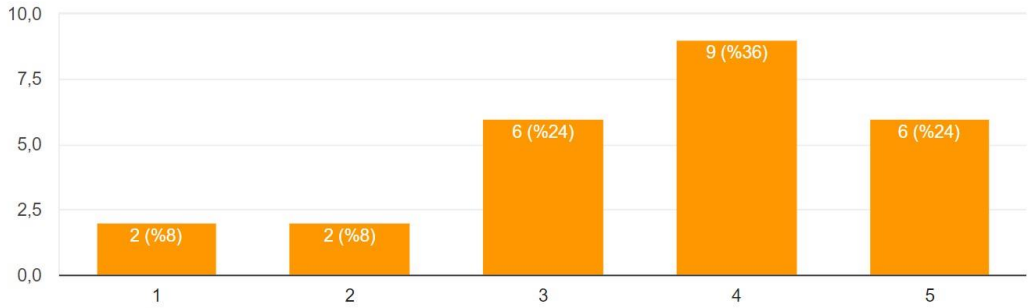

Figure 35. Bar Graph of Results for Question 2.

The result shows that participants are mostly aware of sustainability and recycling. The fact that 24% of the participants are fully conscious about sustainability and recycling, while 36% feel conscious, 24% are undecided, and the remaining percentage does not feel very conscious yet, may indicate that **designers need more information and awareness about this topic.**

3) How efficiently do you utilize rental systems or storages for the products used in your designs?

This question was asked to examine the use of rental systems and storage by scenic designers.

The options were scaled from 1 to 5. 28% of participants (7 out of 25) chose 4, 24% (6 out of 25 for each option) chose 3 and 5; 12% (2 out of 25) chose 2, and 12% (2 out of 25) chose 1 (See Figure 42).

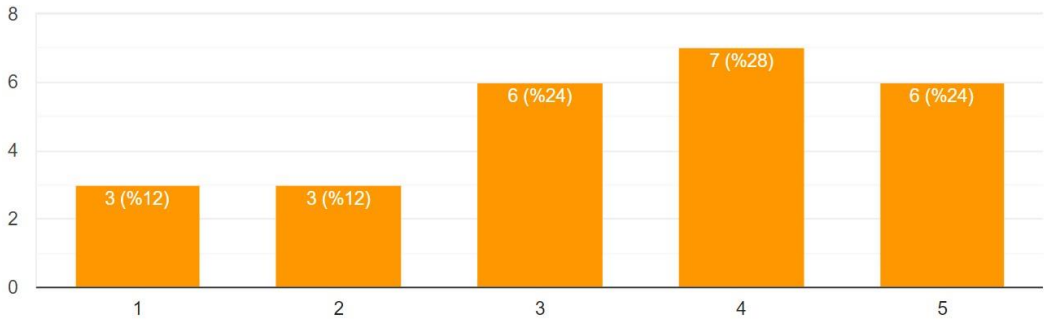

Figure 36. Bar Graph of Results for Question 3.

The result shows that participants mostly use rental systems and storage. However, the

majority percentage being 28% in option four and the number of participants who rarely or do not use the storages being sufficiently high, may indicate that **designers do not have a regular system in place for using the storages or that the number of storages is limited.**

4) How much attention do you pay to make a product reusable when producing it?

This question was asked to examine the extent to which scenic designers consider producing their products as reusable.

The options were scaled from 1 to 5. 56% of participants (14 out of 25) chose 5, 24% (6 out of 25) chose 4, 16% (4 out of 25) chose 3, and 4% (1 out of 25) chose 2 (See Figure 43).

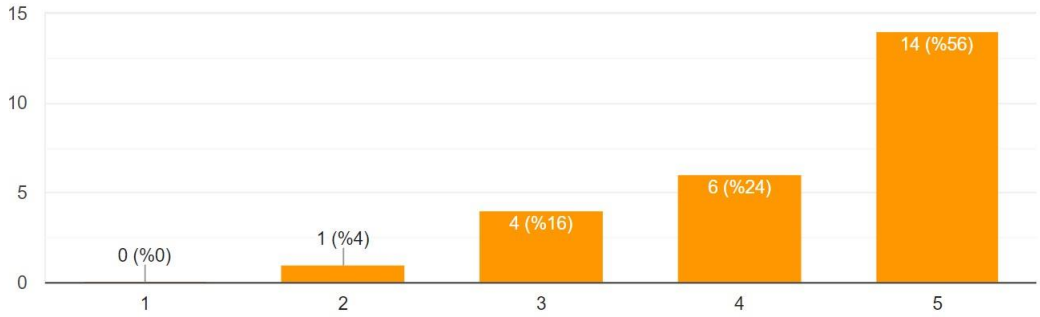

Figure 37. Bar Graph of Results for Question 4.

The result shows most of the participants consider producing reusable products. Although the participants may not feel certain or conscious about sustainability, the fact that 56% of them chose the highest level actually indicates that they contribute to sustainability by **producing reusable products**. The majority generally produce reusable products, and no one selecting the first option also implies a positive inference about the feasibility of sustainability.

5) What percentage of the products you use in your designs are discarded after the performance is done?

This question was asked to examine the number of products discarded by the

participants.

The options were scaled from "none is discarded" to "all are discarded". 44% of the participants (11 out of 25) chose "a small amount is discarded", while 36% (9 out of 25) chose "none is discarded", and 20% (5 out of 25) chose "a moderate amount is discarded" (See Figure 44).

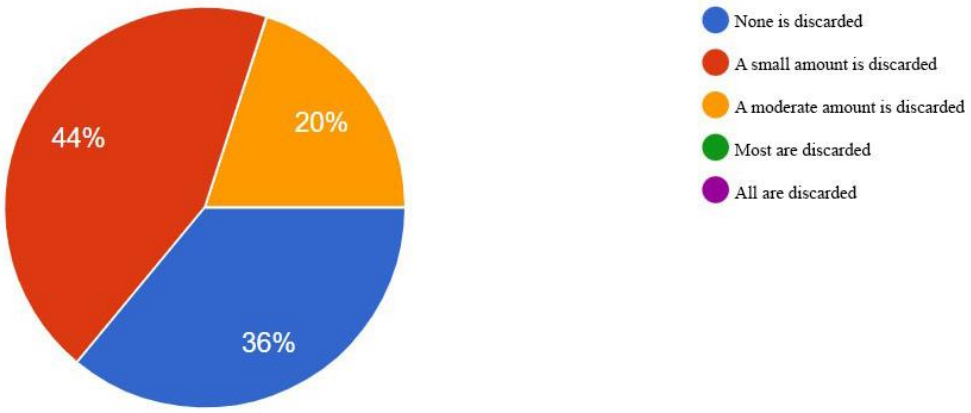

Figure 38. Pie Chart of Results for Question 5.

The result shows that the products are mostly kept and none of the designers fully throws the products away. The statement of 44% of the participants indicated that only a small amount is being discarded, while 36% stated that none is being discarded; followed by 20% selected the option of a moderate amount being discarded, and the remaining options not chosen at all. It indicates that designers are **making efforts to minimize waste**. This is a contributing factor to sustainability.

6) What percentage of the products you use in your designs go to storage after the performance is done?

This question was asked to examine the amount of products stored by the participants.

The options were scaled from "none is stored" to "all are stored". 48% of the participants (12 out of 25) chose "most are discarded", 28% (7 out of 25) chose "all are discarded", 20% (5 out of 25) chose "a small amount is stored", and 4% (1 out of 25) chose "a moderate amount is stored" (See Figure 45).

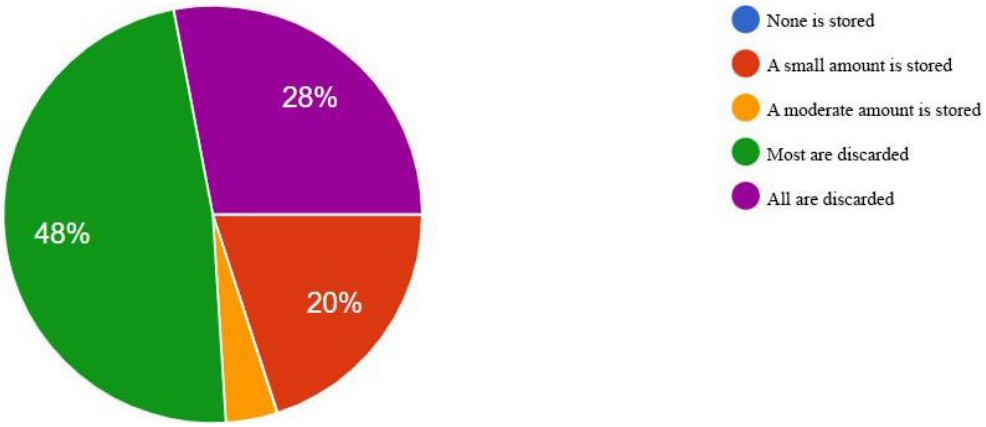

Figure 39. Pie Chart of Results for Question 6.

The result shows that the products are mostly stored. Nearly half of the participants chose the option of most of the props going to storage, 28% selected the option of all props going to storage, and one participant chose the option of a moderate amount going to storage. It indicates that **a significant portion of the props is being stored.** However, the statement of another high percentage, 20%, indicating that only a small amount goes to storage, may show that designers and production companies may have **different working methods or practices.**

7) How much attention do you pay to ensure that the props or artificial materials you design are recyclable?

This question was asked to examine the number of recyclable props or artificial materials used by scenic designers in their designs.

The options were scaled from "none is recyclable" to "all are recyclable". 52% of the participants (13 out of 25) chose "most are recyclable", 32% (8 out of 25) chose "a moderate amount is recyclable", 8% (2 out of 25 for each option) chose "a small amount is recyclable" and "all are recyclable" (See Figure 46).

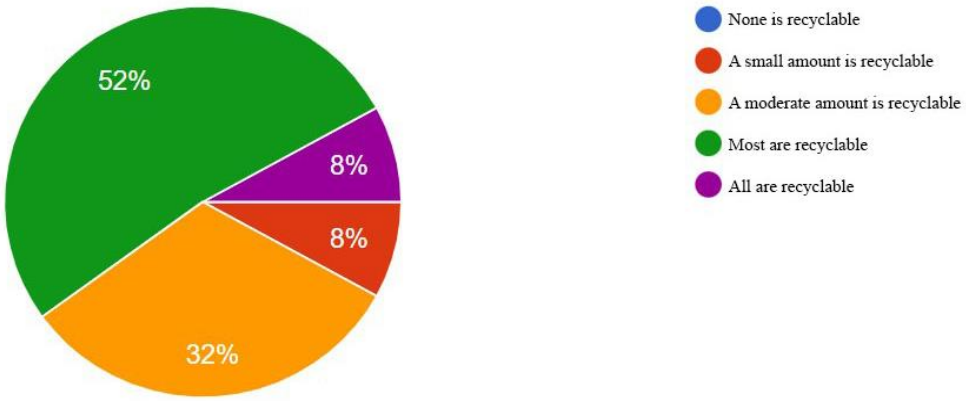

Figure 40. Pie Chart of Results for Question 7.

The result shows that the products are mostly recyclable. More than half of the participants chose the option of most being recyclable, 32% selected the option of a moderate amount being recyclable, and 2 individuals chose the option of all being recyclable. It indicates that **designers with knowledge of recyclable production are striving to incorporate it into their designs as much as possible.** The remaining 2 designers selecting the option of a small amount being recyclable may serve as evidence of efforts in this regard.

8) How much priority do you give to choose natural and sustainable materials in scenic design?

This question was asked to examine the amount of natural and sustainable materials preferred by the scenic designers in their designs.

The options were scaled from the very “I don not prioritize” to “I prioritize very highly”. The 52% of the participants (13 out of 25) chose “I prioritize highly.”, the 24% (6 out of 25) chose “I prioritize at a moderate level”, the 16% (4 out of 25 for each option) chose “I prioritize very highly.”, and 8% (2 out of 25) chose “I prioritize a little” (See Figure 47).

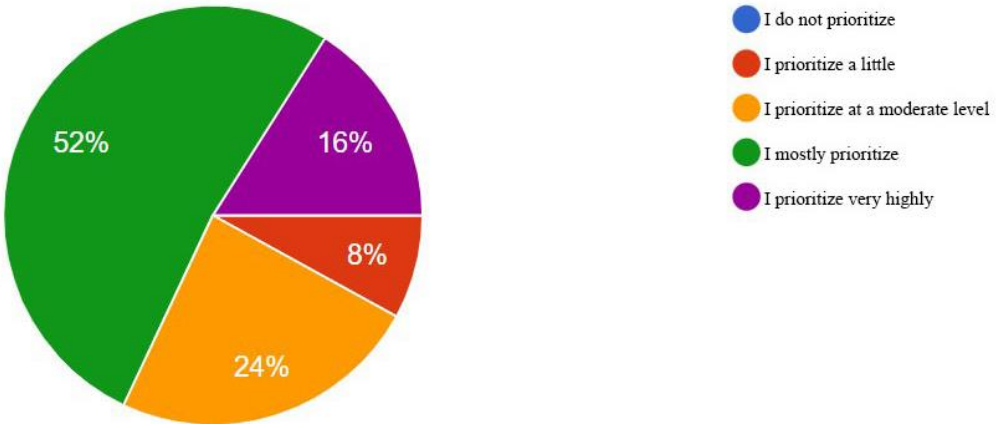

Figure 41. Pie Chart of Results for Question 8.

The result shows that scenic designers mostly prioritize using natural and sustainable materials. More than half of the participants prioritize using natural and sustainable materials, followed by 16% give it a very high priority and 24% give it a moderate priority. It indicates that **designers prefer natural and sustainable materials as much as possible.** 8% who give it low priority may be attributed to other factors such as **budget, resources, or awareness.**

9) In your opinion, are storage and rental systems for stage materials sufficient in Turkey?

This question was asked to examine the thoughts of scenic designers on storage and rental systems in Turkey.

The options were scaled from "not sufficient" to "very sufficient". 56% of the participants (14 out of 25) chose "not sufficient", 24% (6 out of 25) chose "a little sufficient", 12% (3 out of 25) chose "moderately sufficient", and 4% (1 out of 25 for each option) chose "sufficient" and "very sufficient" (See Figure 48).

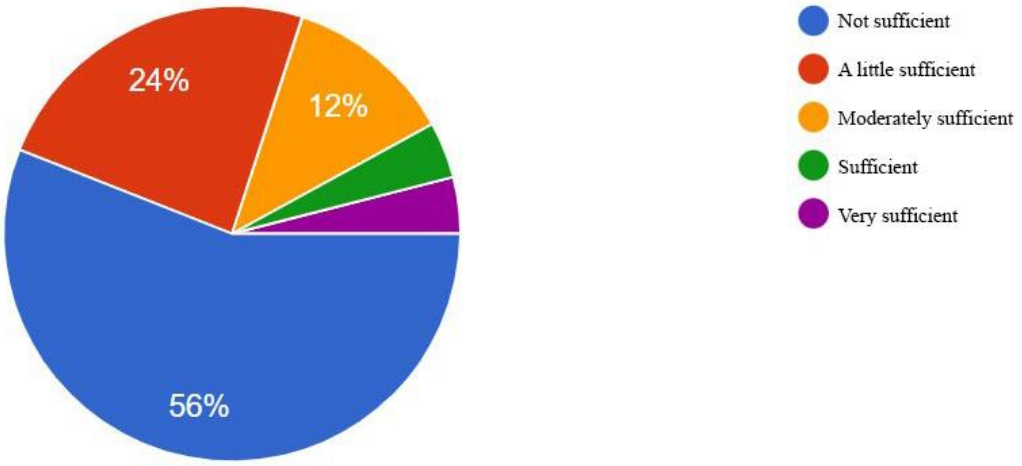

Figure 42. Pie Chart of Results for Question 9.

The result shows that scenic designers find the rental systems and storage not sufficient in Turkey. A significant percentage of participants, such as 56%, stated that it is not sufficient at all, 24% stated that it is a little sufficient, 12% stated it is moderately sufficient, and the remaining 2 designers selected the options of sufficient and very sufficient. It may indicate that the **storage system in Turkey is adequate in certain regions but inadequate in others.** However, the fact that more than half of the participants do not consider it sufficient at all suggests that it is insufficient nationwide. Also, the **accessibility of storage** may be a fact.

10) Do you encounter challenges in the decision-making process for stage materials and supplies in scenic design? If yes, please provide brief examples.

The answers from the scenic designers show that a small number of participants do not encounter challenges. However, the rest of them deal with challenges during the decision-making process. The main challenge is **budget problems**. The budget issues mostly limit the designer. The next challenge is **supply difficulties**. Designers are having a hard time finding the materials they need. Finding **a craftsman** and convincing them to use sustainable design is another challenge. The **lack of communication** between the production members also causes a big problem. Unconscious demands from higher positions also make the process difficult.

11) Do you encounter challenges in the procurement or production process of stage materials and supplies in scenic design? If yes, please provide brief examples.

The answers from scenic designers show that most of them deal with challenges during the production process. The main problem is **financial difficulty.** Designers decide to give up on some materials because of their cost (wooden materials). They also **give up on quality and some design ideas** due to financial problems. **Supply and transportation difficulties** also play an important role. **The lack of knowledge and carelessness** of co-workers also make the process difficult for the designers. The designers do not know where to find the materials they need.

12) Do you encounter challenges in deciding whether to throw away, store, or recycle the products used in the design after the performance is done? If yes, please provide brief examples.

Most designers do not encounter challenges in deciding whether to throw away, store, or recycle the products used in the design after the performance is done. They decide together what to do with the products. However, some of the designs are specially **made for a very specific idea of a play**. It is not possible to use these products in other plays. **The lack of space for storage** is another problem that the designers deal with. In addition, because of **the lack of knowledge** about what the storage has, the products are bought or made over and over again, which causes **stowage**.

13) What do you do to enhance energy efficiency and reduce environmental impact in scenic design? Please answer briefly.

Scenic designers commonly employ solutions such as **utilizing reusable and recyclable materials** as their foremost approach. Additionally, they use rental systems in Turkey to supply props. They avoid the use of fuel-powered machines and prefer **electric machinery** instead. They design products that are **minimal, portable, and easily transportable**. Materials are generally categorized.

14) What are the main challenges you encounter in the use of theatre flats? Please answer briefly.

One of the main challenges in designing for touring productions is ensuring that **theatre flats are compatible with all theatre venues.** Many scenic designers

emphasize the need for **portability**, which requires **lightweight construction**. They also highlight the importance of **sturdy** and **well-balanced structures for the safety** of the personnel and artists working on stage. **Disassembling the products** causes difficulties, making recycling and reusability challenging. Moreover, **finding storage space** is another challenge they face.

15) When selecting the type, size, and materials for theatre flats in scenic design, what factors do you consider? Please answer briefly.

The main factors considered when choosing a theatre flat design include its **suitability for the narrative of the play, cost-effectiveness, durability, reusability, and recyclability.** Additionally, if the theatre flat is intended for touring, its compatibility with all theatre stages it will visit is also taken into account. When choosing a theatre flat design, it is ensured that it does not narrow the space of actors on stage, is made of **natural and non-toxic materials**, is designed to fit the dimensions of transportation trucks and storage spaces, and is **portable and easy to install.**

16) Which features would you like to see in a design that combines the positive characteristics of different types of theatre flats into a single product? (Please select a maximum of 5 options.)

The most required features of theatre flats by scenic designers are **foldability, durability, low cost, sustainability, recyclability, and ease of repair.** Balance, transparency, and opacity follow (See Figure 49).

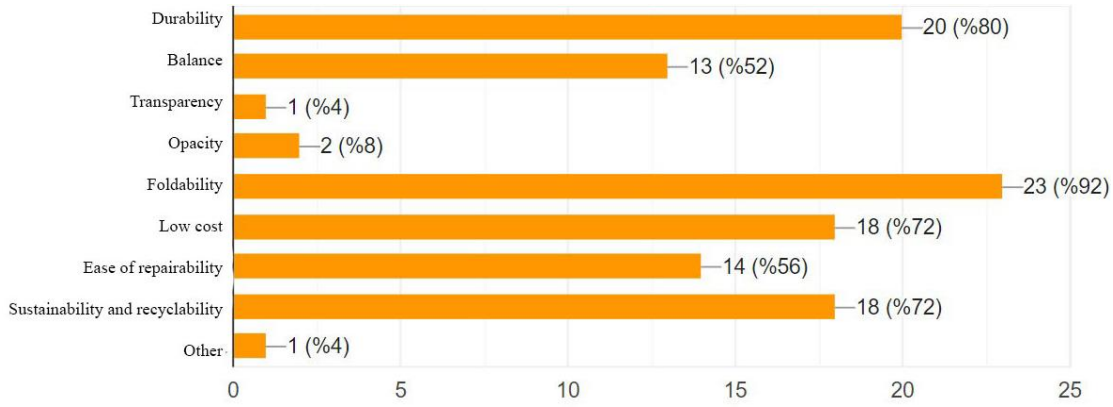

Figure 43. Bar Graph of Results for Question 16.

17) Do you have any alternative product recommendations that meet the mentioned features for the design of a new theatre flat? If yes, what are they? (For framing, coating, balancing, etc.)

Wooden materials, foam materials, metal, plywood, foam board, and cardboard boxes are suggested by scenic designers. In addition, one of the designers suggested dismountable iron frames.

4.3.6. Discussion

Based on all the meetings, interviews, and surveys, one of the primary challenges is the restriction of quality, design, and sustainability practices due to financial support and budget limitations. However, these budget constraints inadvertently or consciously push designers towards methods that promote sustainability, such as reuse, recycling, and efficient storage practices.

Another challenge encountered is the limited number of qualified, professional, and conscious individuals involved in the design process. This leads to communication problems, insufficient time allocated for design, restrictive design guidelines that limit creative freedom, and designers being unable to implement sustainability in their designs to the extent they desire.

One of the main problems reported by all institutions and individuals is the inadequacy of storage space for stage materials, followed by the issue of material congestion. In addition to the limited storage space, insufficient knowledge about the materials stored in the storage leads to designers being unaware of the availability of certain products. As a result, some products are repeatedly produced, leading to waste and stowage. Another problem is the lack of a systematic storage, rental, or borrowing system, which results in some designers being able to use the storage while others cannot access it.

Transportation is a common challenge encountered in scenic design. Due to cost constraints, designers and organizations strive to use the minimum number of vehicles and smaller trucks to transport stage materials. In fact, designers often design their products to fit within a single vehicle, which leads to minimalistic design, lightweight and easily installable or removable products, and consequently, design limitations.

One of the main findings from the survey is that although designers mostly make sustainable choices, it is uncertain whether they do so consciously. Generally, due to budget, supply, and space constraints, they tend to use reusable and recyclable materials, ensuring that products are not discarded but sent to storage after their performance lifespan. These observations support the assumption that designers prioritize sustainability in their choices. To further promote sustainability, it is recommended to organize events on the topic and raise awareness among designers and all individuals involved in the design process via various means. Additionally, establishing organized systems for storage, rental, and borrowing, as well as improving accessibility, would facilitate the more efficient implementation of sustainability in the design process.

Survey results and interviews with scenic designers have revealed additional challenges and corresponding solutions. One common issue identified in both private theatres and interviews with scenic designers is whether the entire design of a play will fit on the theatre stage where it will be performed. This consideration is also relevant to theatre flat design. Another important factor is ensuring the stability and durability of the flats, as this ensures the safety of the stage crew and actors. By addressing these factors, the overall functionality and safety of the stage can be improved.

Survey results and interviews have also highlighted another challenge: the reduced reusability due to the custom design of certain sets. In some cases, specific designs are created exclusively for a particular production, limiting their potential for future reuse. This can pose a challenge to achieving sustainability goals in scenic design. To address this issue, designers can explore modular or adaptable designs that can be easily modified or repurposed for different productions, thus increasing their reusability and minimizing waste. However, according to the scenic designer Karakaya, modular design may also limit the design ideas, and it is not ethical to use some modular design in different designs by different designers.

When examining the use of digital technology in stage design from a sustainability perspective, Büyükberber argues that the use of LED screens would reduce material consumption and decrease the transportation energy required by minimizing the transportation of physical materials. Karakaya adds that while the use of LED screens

can be beneficial for projects such as films and advertisements that involve single takes, it would be costly and not preferred for theatre productions that go on long tours. Therefore, designs created in the digital environment can be quickly transmitted to distant locations, which supports efforts in sustainability.

CHAPTER 5: CONCLUSION

This study, which began in order to analyze the scenic design process in performing arts, focused on the design challenges regarding the sustainable use of props in scenic design to answer the research questions of the study, which are:

1. To what extent do scenic designers in Turkey possess awareness regarding the utilization of sustainability in scenic design?

2. What design strategies do scenic designers in Turkey employ, and what types of materials do they prefer to utilize in order to incorporate sustainability and recycling into scenic design?

Applied research method was selected for this study, which aims to find a solution for an immediate problem facing a society or an industrial or business organization (Kothari, 2004, p. 3).

The study initiated with the aim of addressing the waste of props, focused on finding sustainable solutions within the scenic design process. Due to the lack of detailed studies and challenges in the field of stage design, data were obtained from existing literature, and it was decided to gather the remaining data in the field with the help of professionals. Based on the technical information gathered from existing literature, the framework of the study and a set of guidelines were created. Once the research focus of the study was determined, the relevant topics were arranged in a systematic form for Chapter 1, which discusses the definition and framework of scenic design. Based on the identified gaps in the literature, the study was shaped accordingly. In the ongoing research process, starting with scenic design, it was decided to identify the main reasons for the lack of literature and, specifically, the lack of studies on this topic in Turkey. Upon this determination, while the literature part was getting completed, the required data was collected from the professionals in the field. In light of the collected data, certain challenges were determined, which are the budget limitation, the lack of professionals in each field; the use, transportation, and most importantly, the storage of props, the waste of props, and more. Based on findings from literature,

interviews, meetings, and surveys, the main problems identified were financial constraints, lack of education about sustainability, theater equipment, and insufficient storage space for props.

When the most common challenges were determined, it was decided that integrating sustainable design into this process could provide solutions to these challenges. The history and development of scenic design were explored, and in this process, it was examined to determine to what extent sustainability took place in scenic design.

It was determined that, digital technology, modular design, and sustainability could be utilized to generate solutions. In addition, supplementary solutions such as providing sustainability education, ensuring storage areas and systems, strengthening communication between theatres and storage facilities, utilizing digital technology, and employing modular design were proposed.

Meetings were arranged with municipal and private theatres while conducting literature and field research. According to the information received from these places, it was determined that similar challenges were experienced, and the authorities gave permission to witness the stage installation process. With the help of the literature review and in light of the data gathered so far, sustainable solutions were offered to the challenges encountered, which are modular design, digital technology use, and applying sustainability to the making and storage processes of props.

In addition to classical theatre design, it was decided to examine digital technology, which is a big part of contemporary life, especially after the pandemic process, and to investigate whether it contributes to sustainability. In this direction, data was collected from both the literature and one of the most important Turkish digital artist names, Can Büyükberber, and sustainability was discussed. Inferences were made about which areas and to what extent digital art can benefit sustainability in scenic design.

As part of this research, interviews were held with scenic designer Sıla Karakaya, who has played a crucial role in emphasizing sustainability in scenic design for this study. Karakaya, who is active in the field, gave information about the challenges and stated that the main problem in Turkey is the lack of theatre flat storage. She also stated that

the LED screens to be rented for the use of digital technology would be expensive for theatre play tours. Furthermore, Sıla Karakaya mentioned that renting LED screens for digital technology use could be expensive, especially for tours. Both interviewees emphasized that digital technology would be more beneficial for one-time projects or concerts. Furthermore, it was mentioned that implementing modular design in practice can be challenging due to the limitations of using the design of another designer as a scene designer and the potential constraints that modular design can impose on the overall design process.

In addition, during the interview with the scenic designer of "Tatavla'da Son Dans," Serkan Kavurt, it was mentioned that props are often purchased second-hand instead of being rented, and then modifications are made to them. It was also noted that these props generally become specific to that particular production. It was added that due to the unique design of the props, it is difficult for them to be used across different theatres, and therefore they always require modifications. Kavurt stated that due to the prohibition on selling props from state theatres, they are being destroyed. Instead, he proposed that they could be donated to theatre schools or theatre clubs of schools. He also agreed that the modular design could limit the design.

As the main method of the study, based on the data collected so far, questions were prepared to address the research questions. A total of 25 scenic designers with different experiences from various regions of Turkey were selected to participate in the survey, and they were asked to answer the questions.

Survey results reveal that the majority of scenic designers hold positive attitudes towards sustainability and strive to implement it in their designs by using reusable and recyclable products and employing storage practices. However, they find themselves constrained due to several challenges. Examples of these challenges include financial constraints, supply difficulties, a scarcity of skilled and conscious workers, and inadequate storage space. The primary solutions they employ to address these challenges are compromising on quality and certain ideas, creating minimal and easily portable designs, utilizing reusable and recyclable products, and implementing storage practices. They also use rental systems, primarily to reduce cost.

This study suggests the implementation of sustainability by using technology and several strategies for the props use process in light of the collected data. While LED screen rental and usage prove to be cost-effective in the long run for films, series, and advertisements, they can be expensive for theatres that go on tours. Modular design, theoretically, can contribute to sustainability; however, in practice, ethical concerns arise when the same design is used by different designers.

The use of props presents the most viable opportunity for implementing sustainability. In the production process, selecting reusable and recyclable materials, designing props to be suitable for transportation during the moving process, and minimizing the use of vehicles can be recommended. Additionally, efficient and organized storage practices should be implemented during the storage process. Storage and rental systems for props, especially theatre flats, need to be improved and enhanced.

A literature review conducted to address the lack of information regarding the extent of awareness among scenic designers about sustainability and their implementation of sustainability in their designs revealed a significant knowledge gap. Adequate information could not be obtained regarding scenic designs that serve as examples of sustainability. The research identified a lack of educational information reaching the public about designs that incorporate sustainability. Based on these findings, this study proposes increasing efforts to raise awareness among society about sustainability and advocating for greater representation of such examples in the media. In order to address the knowledge gap identified in the literature review, a direct approach was taken to reach out to scenic designers. For this purpose, a survey was conducted among scenic designers to obtain answers to the research questions. The survey also aimed to explore the strategies and materials used by scenic designers to implement sustainability in their designs, in order to obtain answers to the second research question.

The focus of this thesis is determined by the common concern expressed by scenic designers Mimi Lien and Beowulf Boritt (2005), regarding the wastage of props in scenic design. The aim is to address the wastage of props and stage materials under sustainability. The suggestion of Shedroff (2019), "reduce, reuse, recycle, restore, and process" for applying sustainability to stage design forms the framework of this study.

suggestions of Hart (2017), which is pulling and borrowing, combined with pulling suggestions of Mussman (2008) and Gillette (1987), have generated specific solution proposals. According to the results obtained from the survey, these ideas can be supported as follows:

Each production and theatre team should document their stage materials in a systematic digital inventory system and regularly update it. This way, the items in stock can be identified, and the repeated production of items can be prevented, resulting in savings of materials and time. The problem of not knowing what is in stock, as mentioned by scenic designer Tom Piper (2022), will be eliminated through the use of digital inventory systems in warehouses. Additionally, a strong network among designers will facilitate the exchange of ideas and information, leading to increased awareness of sustainability.

Another solution proposal that emerged from the survey results is to educate team members about sustainability and promote strong and effective communication among team members. Additionally, as mentioned by Bordelon (2022), members of the design team should be skilled in order to propose solutions for sustainability, enabling them to use materials and equipment more consciously and efficiently. Collaboration within the design team, as highlighted by Jonīte (2021), is also a crucial factor. The stronger the communication within the team, the faster sustainability recommendations can be identified, implemented, and thus, time can be saved.

When discussing the use of digital technology and modular design in scenic design, it is important to consider that, as noted by Wolf and Block (2014), each performance has its unique requirements. As highlighted by Karakaya, the usefulness or lack thereof of digital technology and modular design can vary depending on the type of performance. Therefore, it is essential to first identify the needs of the performance and develop the most suitable design plan in terms of time, cost, and theme. Hart (2017) mentioned that often using a local product is more environmentally beneficial than shipping in a greener alternative, which considers that transportation is also an important aspect for sustainability. In line with this topic, Büyükberber has mentioned that digital technology can prevent the physical transportation of stage materials, enabling art to reach even remote locations.

The suggested solutions aim to significantly advance the discussion on sustainable scenic design, not only in Turkey but also globally, by combining knowledge from the field of scenic design with previously published literature. The findings of this study have the potential to be highly beneficial for professionals in the field, particularly for scenic designers in Turkey. Additionally, it aims to serve as a guiding compass for researchers, bridging the existing literature gap in this specific area of study. The study intends to raise awareness among the designer community and scenic designers regarding sustainability, examine the current impact of sustainability on performing arts in Turkey and worldwide, and propose new solutions and their implementation based on existing knowledge and solutions. Further studies may involve, research with more participants, categorization with regards to various types of performance needs, and design proposals that may guide designers. To conduct research with a larger and more diverse pool of participants would strengthen the validity and generalizability of the findings. Involving scenic designers, theater practitioners, architects, environmental experts, and other stakeholders could offer a comprehensive perspective on the challenges and opportunities related to sustainability in scenic design. Different types of performances, such as theatrical plays, dance performances, music concerts, and multimedia shows, may have unique requirements and constraints. An appealing research topic may be exploring how to incorporate innovative technologies and new materials into sustainable scenic design. The potential for reducing the environmental impact of performing arts is made possible by developments in digital technology, renewable energy sources, and biodegradable materials. For design decision-makers in the performing arts industry, examining the costs associated with converting to sustainable methods and materials as well as possible long-term savings and environmental advantages would be highly beneficial. By proving that sustainability and financial success are mutually beneficial, theatre producers, venues, and designers may be more likely to implement environmentally friendly processes. The implementation of these suggestions could be the focus of further study. It would be possible to provide concrete evidence of the sustainability and importance of sustainable practices by working with theatre companies and scenic designers to experiment with sustainable design projects and evaluate their success.

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APPENDICES

Appendix A – Interview Questions with Can Büyükberber

Interview purpose: Digital technology use in art and its impact on sustainable design

Interview with: Can Büyükberber – Visual Artist

1. Please give a short brief about your art and projects.
2. What were the purposes of you to start digital art? Have you worked in any other fields?
3. Please give some examples of your art projects.
4. What is your source of inspiration and your motivation before you start a work?
5. How does the design process start?
6. How do you manage the design process schedule and deadlines? What are the difficulties you have to deal with during this process and how do you deal with them?
7. What is your opinion on sustainability and do you use it in your projects?
8. What do you think about the digital technology use in scenic design for the performing arts?
9. Do you think digital technology in art contributes to sustainability?

Appendix B – Online Survey Questions

This is the original survey in Turkish. The English version is discussed witin the thesis text.

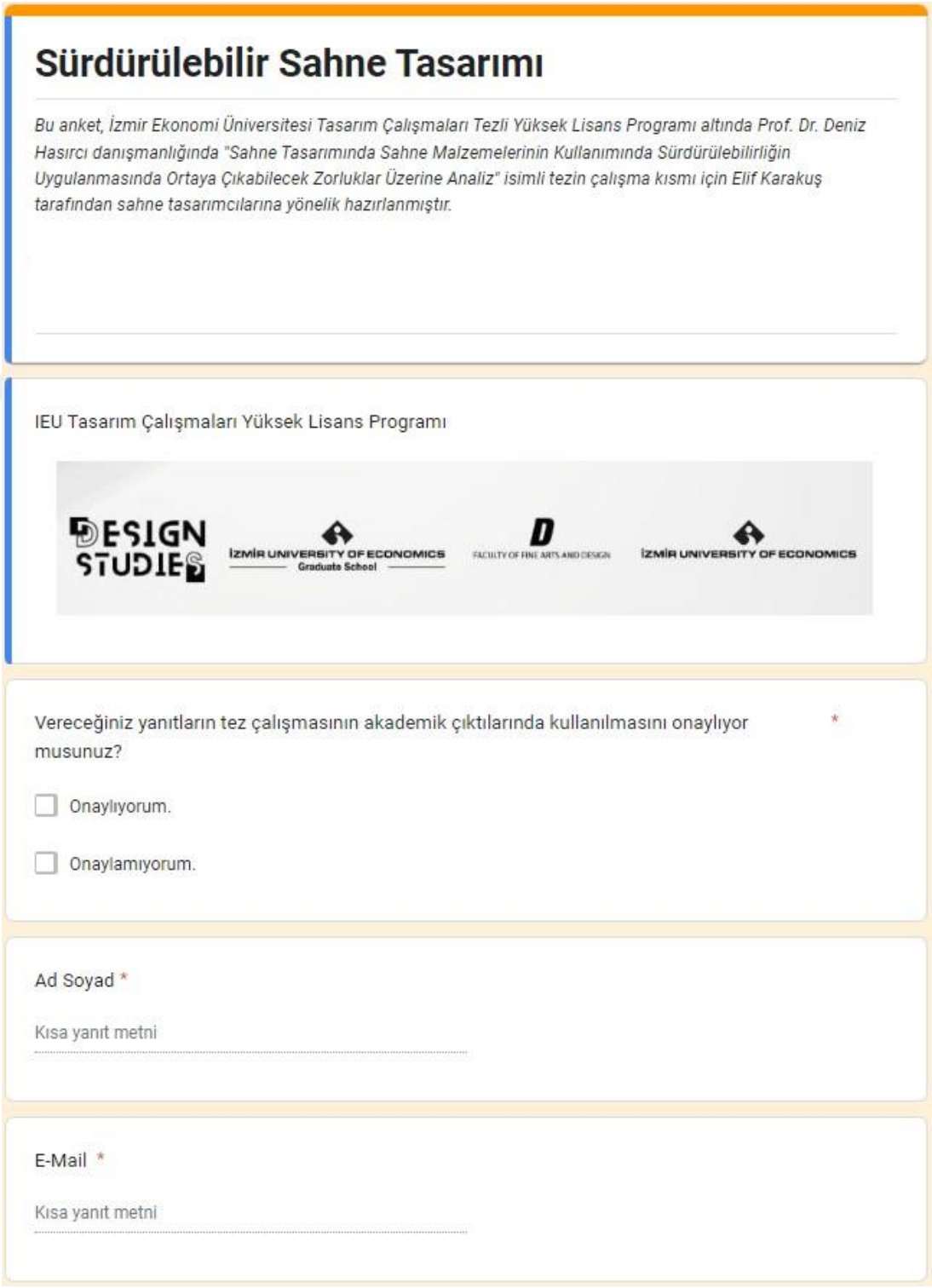


Figure 44 (continued). Online Survey for Scenic Designers.

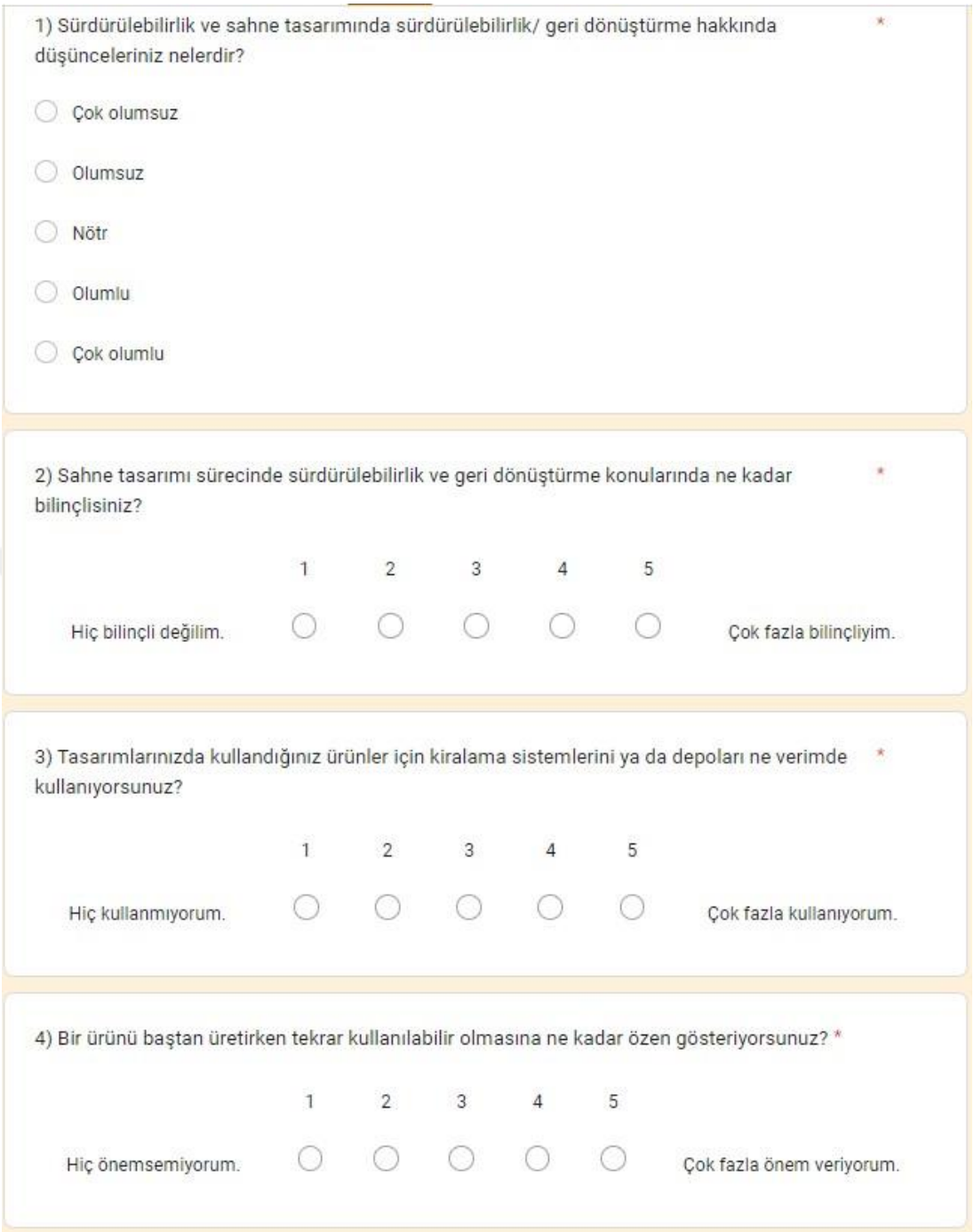


Figure 44 (continued). Online Survey for Scenic Designers.

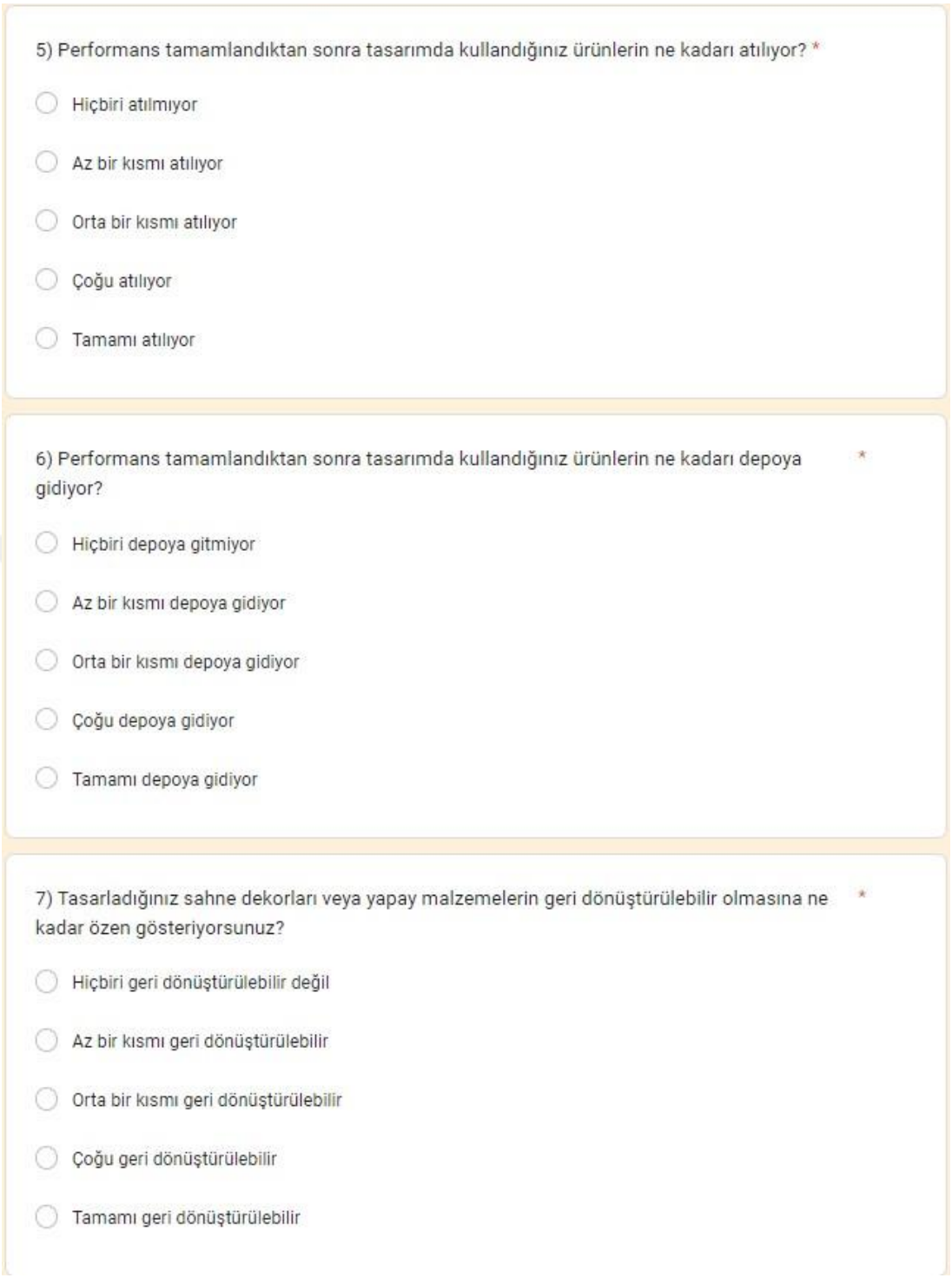


Figure 44 (continued). Online Survey for Scenic Designers.

8) Sahne tasarımında doğal ve sürdürülebilir malzemeleri tercih etme konusunda ne kadar öncelik veriyorsunuz? *

- Hiç öncelik vermiyorum
- Az öncelik veriyorum
- Orta düzeyde öncelik veriyorum
- Yüksek öncelik veriyorum
- Çok yüksek öncelik veriyorum

9) Sizce Türkiye' de sahne malzemeleri depolama ve kiralama sistemleri yeterli mi? *

- Hiç yeterli değil
- Biraz yeterli
- Orta düzeyde yeterli
- Yeterli
- Çok yeterli

10) Sahne tasarımında kullanılacak sahne malzemelerine ve materyallere karar verilme sürecinde zorluklarla karşılaşıyor musunuz? (Cevabınız evet ise, kısaca örnekler veriniz.) *

Uzun yanıt metni

11) Sahne tasarımında kullanılacak sahne malzemelerini ve materyallerini tedarik etme ya da üretme sürecinde zorluklarla karşılaşıyor musunuz? (Cevabınız evet ise, kısaca örnekler veriniz.) *

Uzun yanıt metni

Figure 44 (continued). Online Survey for Scenic Designers.

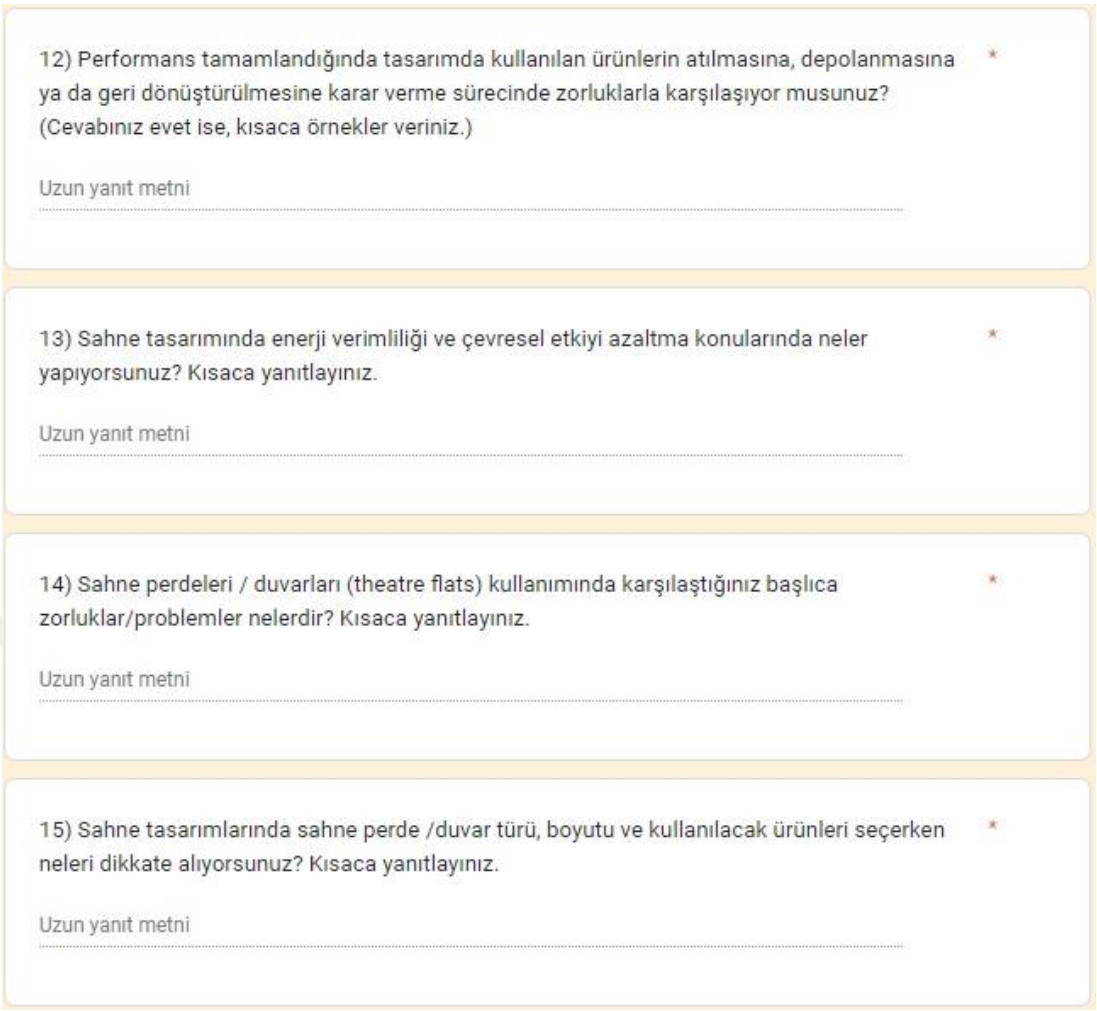
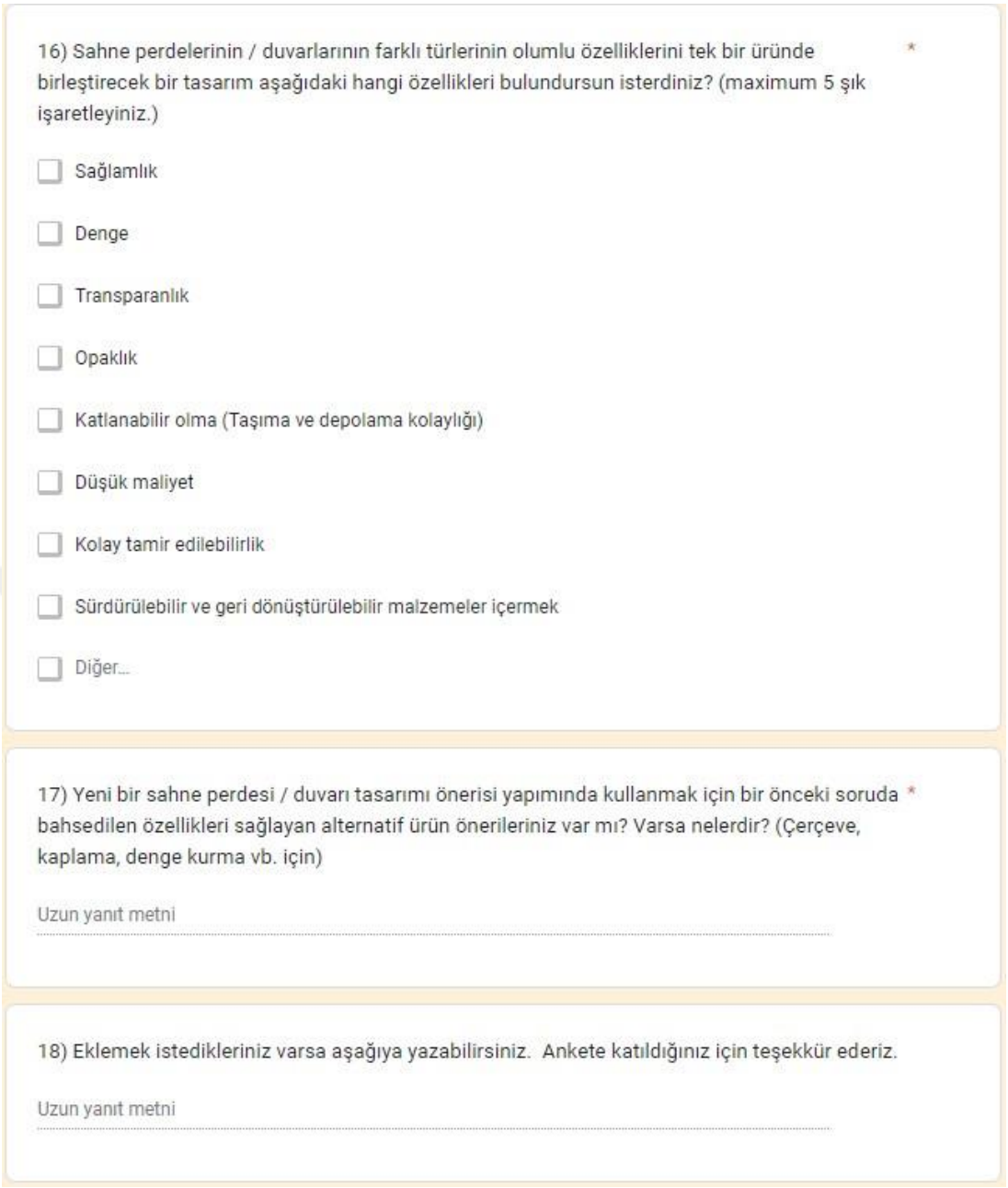


Figure 44 (continued). Online Survey for Scenic Designers.


16) Sahne perdelerinin / duvarlarının farklı türlerinin olumlu özelliklerini tek bir üründe birleştirecek bir tasarım aşağıdaki hangi özellikleri bulundursun isterdiniz? (maximum 5 şık işaretleyiniz.) *

- [ ] Sağlamlık
- [ ] Denge
- [ ] Transparanlık
- [ ] Opaklık
- [ ] Katlanabilir olma (Taşıma ve depolama kolaylığı)
- [ ] Düşük maliyet
- [ ] Kolay tamir edilebilirlik
- [ ] Sürdürülebilir ve geri dönüştürülebilir malzemeler içermek
- [ ] Diğer...

17) Yeni bir sahne perdesi / duvarı tasarımı önerisi yapımında kullanmak için bir önceki soruda bahsedilen özellikleri sağlayan alternatif ürün önerileriniz var mı? Varsa nelerdir? (Çerçeve, kaplama, denge kurma vb. için) *

Uzun yanıt metni

18) Eklemek istedikleriniz varsa aşağıya yazabilirsiniz. Ankete katıldığınız için teşekkür ederiz.

Uzun yanıt metni

Figure 44. Online Survey for Scenic Designers.